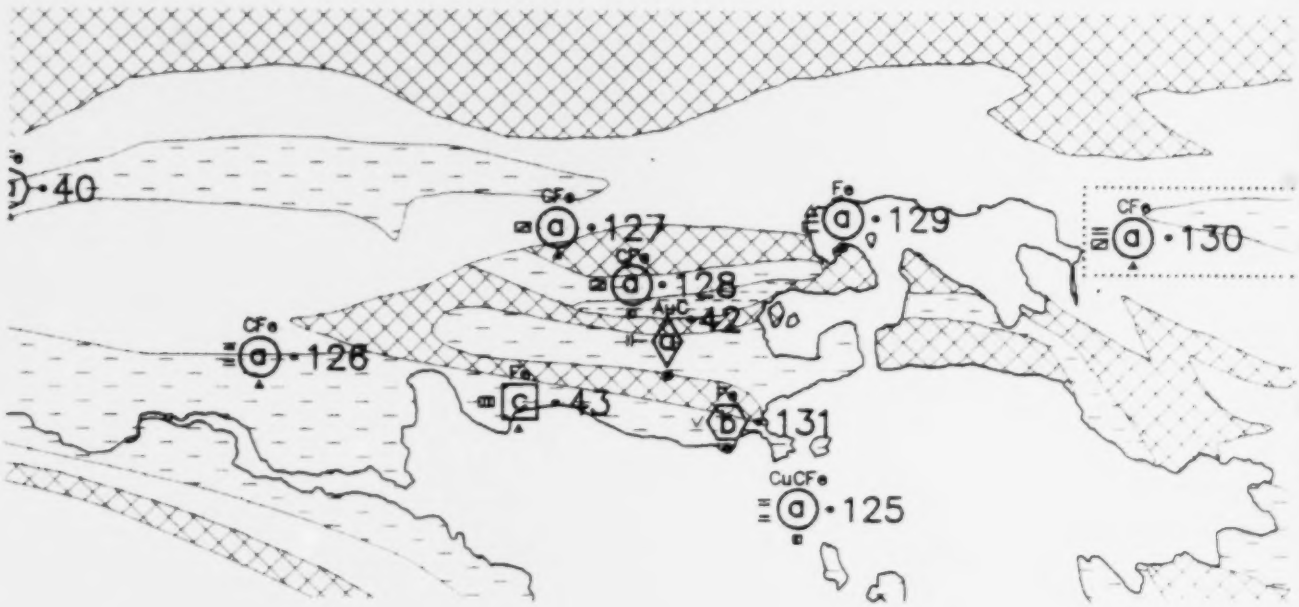
Mineral Deposit Series Report No. 31



Mineral Deposits and Occurrences in the Iskwasum Lake Area, Manitoba, NTS 63K10

by T.H. Heine

2003

Manitoba

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by T. H. Heine, Regional Geologist
Flin Flon, Manitoba, 2003

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INTRODUCTION

This report and accompanying maps are part of a Mineral Deposit Series presenting a uniformly organized and up-to-date collation and analysis of information on mineral occurrences in the Province of Manitoba. The series is intended: (1) to provide explorationists with a geoscientific database that can be used in mineral exploration; and (2) to provide a technical database for government use in resource evaluations, formulation of mineral and land use policies and the initiation of regional development programs.

Methodology

The documentation program was initiated in the main mining districts of the province under the 1984-1989 Canada-Manitoba Mineral Development Agreement. Under this project, mineral deposit geologists of the Manitoba Geological Survey have attempted to inspect and evaluate each known mineral occurrence. These site visits ranged from a preliminary half-day or less search of an area for old workings, to extensive geological mapping of selected occurrences for a week or more. In addition, for each occurrence the geologists have attempted to synthesize available data from published and unpublished sources. The Manitoba Mineral Inventory Card Index and the cancelled assessment files have been used extensively in the preparation of this report. Mineral occurrence documentations representing only cancelled assessment file compilations are identified as such under the heading 'Name'. Information for all other occurrences was acquired primarily by field examination supplemented by cancelled assessment file compilations.

The locations of all mineral deposits and occurrences are presented in Figure 1.

Deposit versus occurrence

Throughout this report mineralization is referred to as a deposit if tonnage and grade figures are known; all other mineralization is referred to as an occurrence.

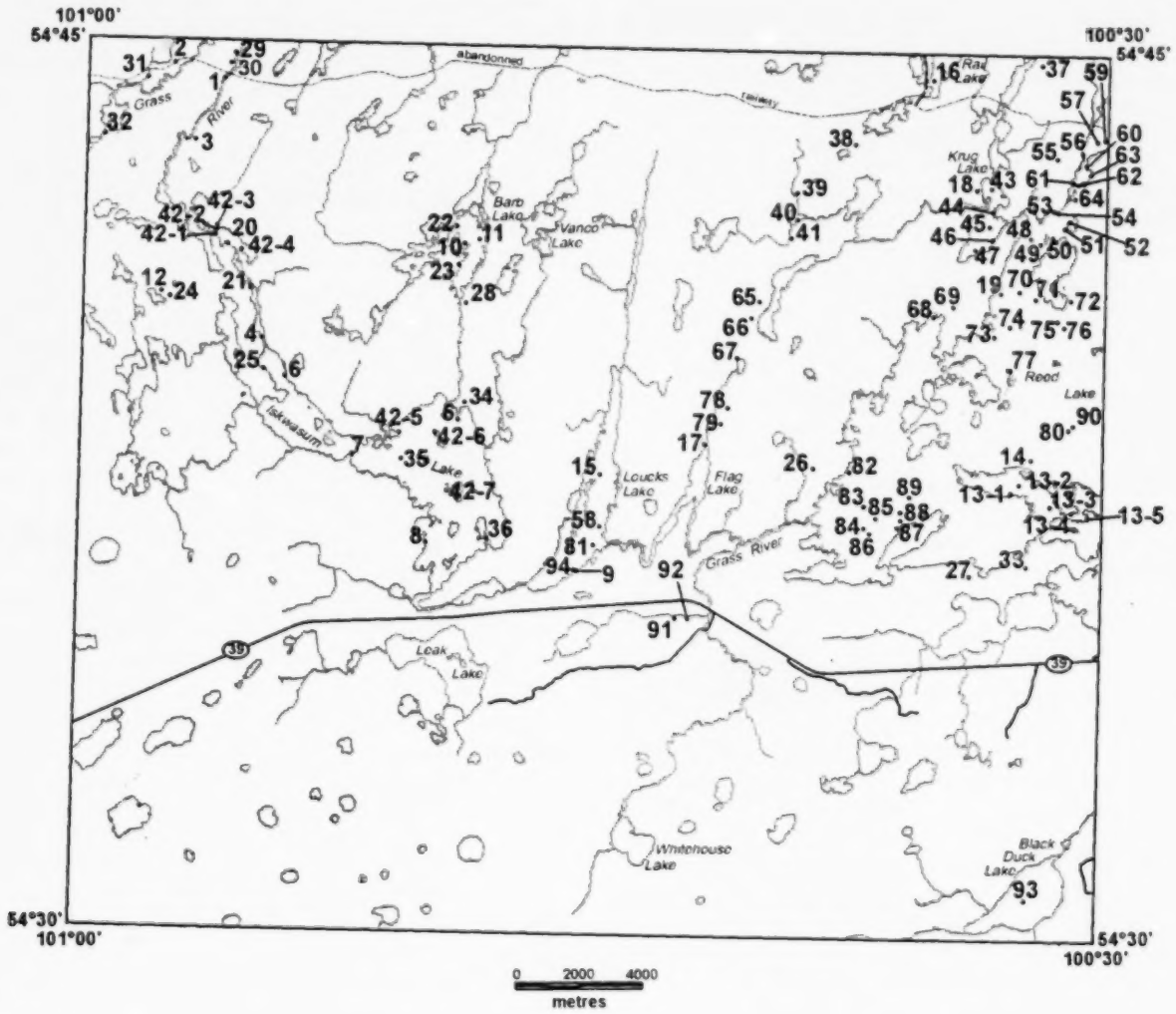

Figure 1: Location of mineral deposits and occurrences (63K10).

Massive sulphide versus solid sulphide

The use of 'massive sulphide' in the geological literature is confusing in that it is not always clear whether the authors are referring to a 'massive sulphide deposit' (cf. Sangster, 1972) or a section of sulphide-rich rock. In this publication 'massive sulphide' will be used in reference to a deposit type, i.e., a volcanogenic massive sulphide deposit type, rather than the nature of the mineralization. A volcanogenic or sedimentogenic massive sulphide deposit can contain a sulphide lens that locally contains as little as 10% sulphide minerals by volume. The alteration zones that are an integral part of many massive sulphide deposits rarely contain more than 50% sulphide minerals. Consequently, the use of 'solid sulphide' for 75% to 100% and 'near solid sulphide' for 50% to 75% sulphide minerals is adopted in place of the commonly used term 'massive' to describe the quantitative aspects of the sulphide mineralization.

Format of Mineral Deposit Maps

Location

One of the incentives spurring mineral deposit documentation was the absence of accurate location maps for known mineral occurrences. Inaccurate land bases have previously resulted in failure to find old workings, surveys conducted in wrong areas, and even cancellation of intended surveys by explorationists. Consequently, considerable field time has been spent in establishing occurrence locations and attempts have been made to display exact locations to within approximately 10 metres both on the maps and in the report.

The location number on the map is a unique reference number that will be used both in the report and the geologists' unpublished database. Where the volume of occurrence/deposit data within a 1:50 000 NTS map sheet is large enough to be more efficiently presented by dividing the map sheet in half or into quadrants (cf. Map MDS87-1, NTS 63K13 SE), reference numbers will be consecutive only within the individual map sheet. Where the density of data warrants the publication of a 1:10 000 map sheet, location numbers are consecutive within each 1:50 000 area.

Deposit types

In order to maintain a mineral deposit classification, which will be useful to both explorationists and metallogeneticists, a simplified descriptive classification was selected. This classification is based on the use of common deposit types for the classification of both deposits and occurrences. The classification of mineralization is based on the premise that the mineral explorationist requires information on metals and types of mineralization in an area as well as on the economic deposits (past and present producers).

All deposits and occurrences are classified according to the deposit type classification in Table 1.

The deposit type displayed on the map represents mineralization with the greatest economic potential, e.g., a disseminated narrow chalcopyrite layer is emphasized over a much thicker solid pyrite-graphite layer.

Mineralization

A symbol is used to denote the percentage and/or type of mineralization present. At some localities more than one type of mineralization is present. The type of mineralization displayed in the symbol represents the mineralization with the greatest economic potential as indicated by the deposit type symbol. It should be noted that, in the context of this report, a "sulphide facies iron formation" is equivalent to a "sulphide stratum". For a discussion of sulphide stratum the reader is referred to Gale et al. (1980).

Some occurrences have a significant strike extent or occur as an area of mineralization. An example of the former case would be a sulphide layer that is the cause of an EM conductor. In these cases the location of the occurrence is indicated in the central part of the conductive response. Separate conductive responses, where they have been proven to be associated with sulphide mineralization, are indicated as separate occurrences.

Host rocks

In general, this description refers to the immediately underlying and overlying rock types. When a number of rock types are present in an extensive zone of mineralization, the most common rock types are indicated.

TABLE 1: MINERAL DEPOSIT TYPES

STRATABOUND MASSIVE SULPHIDE TYPE DEPOSITS
- a) Volcanic rock associated
- b) Sedimentary rock associated
- c) Alteration zone associated with a or b

CHEMICAL SEDIMENT-TYPE DEPOSITS
- a) Sulphide facies iron formation
- b) Oxide facies iron formation
- c) Carbonate facies iron formation
- d) Silicate facies iron formation
- e) Other chemical sediments

VEIN-TYPE DEPOSITS
- a) Single vein
- b) Multiple veins or lenses
- c) Stockwork

MAGMATOGENIC-TYPE DEPOSITS ASSOCIATED WITH MAFIC/ULTRAMAFIC ROCKS
- a) Disseminated
- b) Layered
- c) Net textured
- d) Podiform

DEPOSITS WITH PORPHYRY AFFINITIES

PEGMATITE-TYPE DEPOSITS

CLASTIC SEDIMENT-TYPE DEPOSITS

REPLACEMENT-TYPE DEPOSIT

DISSEMINATED MINERALIZATION - NOT CLASSIFIED

Elements

This description allows for a maximum of three metals present in increasing order of abundance by volume. The precious and base metals are indicated in preference to elements such as iron and carbon.

Format of Mineral Deposit Reports

Location

Each deposit or occurrence description will contain the unique reference number, deposit or claim name where applicable, UTM coordinates (NAD83, zone 14), general area description, the reference number of the airphoto on which the deposit can be located and a brief description of method(s) of access.

Exploration summary

This section provides a summary of the extent of exploration and was compiled from Mineral Inventory Cards, cancelled assessment files, and maps and files from the Mining Recording Office.

Geological setting

In this section the general geology of a deposit or occurrence is described. The information levels of the descriptions vary considerably and depend largely upon the extent of geological mapping during the documentation project. For further details the reader should consult the references cited.

In this report, volcanic and sedimentary rock names are used rather than metamorphic equivalents in order to simplify and clarify the descriptions of the occurrence rock types. All supracrustal units have been metamorphosed to at least greenschist grade.

Mineralization

A detailed description of the mineralization provides readers with the opportunity to make their own evaluation of the significance of a mineral occurrence or deposit.

Geochemical data

Most geochemical data included in this report are summarized from assays listed in drill logs submitted to fulfill assessment requirements. In addition, samples collected for geochemical analysis from site visits are described in this section.

Classification

In this section the geologist may indicate the reasons for the classification appearing on the mineral deposit maps. For those localities containing more than one deposit type, the deposit types not shown on the maps are documented here.

References

These include both published and unpublished sources. For published and assessment report information the reader should obtain the desired material directly from the source. The mineral deposit geologists will endeavor to supply copies of unpublished material on a deposit by deposit basis.

References listed at the end of each occurrence description may also include sources of additional information not directly cited in the text.

Abbreviations

The following abbreviations are used throughout the occurrence descriptions:

AEM	airborne electromagnetic
A.F.	assessment file(s)
AFMAG	audiofrequency magnetic
AMAG	airborne magnetic
apy	arsenopyrite
Ag	silver
Au	gold
bn	bornite
cm	centimetre
c	carbonatized
Cd	cadmium
Co	cobalt
conc	concentration
cp	chalcopyrite
Cu	copper
DDH	diamond-drill hole(s)
EM	electromagnetic
fsh	fuchsite
g/t	grams per tonne
hem	hematite
HLEM	horizontal loop electromagnetic
if	iron formation
K-spar	potassium feldspar
m	metre
MAG	magnetic
MDS	Mineral Deposit Series
mb	molybdenite
Mo	molybdenum
Ni	nickel
ns	near solid
oz./ton	ounces per ton
Pb	lead
ppb	parts per billion
ppm	parts per million
po	pyrrhotite
py	pyrite
qtz	quartz
shr	sheared
sl	slightly mineralized
to	tourmaline
tr	trace
VL-EM	vertical loop electromagnetic
VLF-EM	very low frequency electromagnetic
wm	well mineralized
Zn	zinc

Acknowledgments

Mr. Zerai Andegeorgs and Ms. Rebecca Jacksteit provided enthusiastic field assistance while examining and mapping the mineral occurrences. Ms. Jacksteit assisted with digitizing some of the figures for this report.

NOTE:

This mineral deposit report and the accompanying maps are intended to be active documents that can be updated as new information becomes available. Although revisions of the publication are anticipated, any additional unpublished information may be obtained by contacting the author or the Director, Manitoba Geological Survey.

GEOLOGY OF NTS 63K10

Introduction

Initial investigations in NTS area 63K10 were undertaken by Bruce (1918) with subsequent studies of the geology and mineral deposits by Alcock (1920), Armstrong (1923), Stockwell (1935), Harrison (1949), Hunt (1970), Rousell (1970), Bailes (1971), Williamson (1992, 1993, 1994), Heine (1993), Syme (1993, 1994), Syme *et al.* (1995) and Williamson and Eckstrand (1995). The geologic base for the location index map (MDS Map No. 31, in pocket) is based on the 1:100 000 NATMAP Shield Margin Project of the Flin Flon Belt (NATMAP Shield Margin Working Group, 1998). The NATMAP lithologic classification scheme is retained in this report.

Regional setting

Supracrustal rocks in the Iskwasum Lake map-area belong to the 1920 to 1880 Ma Amisk collage (Stern and Lucas, 1994; Syme, 1994, Syme *et al.*, 1995; Lucas *et al.*, 1996, 1999), formerly called the Amisk Group, and are a continuation of the sequence that occurs in the Elbow Lake and North Star Lake area to the north (NTS 63K15, and the Cranberry lakes area to the west (NTS 63K11). The southern third of the Iskwasum Lake NTS area is covered by dolostone of the Ordovician Red River formation. The distribution of Precambrian units under Paleozoic cover is based mainly on diamond drillhole information, and total field and vertical gradient magnetic data.

Supracrustal rocks

The McDougalls Point basalt (unit F1a) extends eastward from the Cranberry lakes to the west side of Iskwasum Lake. Primary features such as pillows, flow contacts, amygdules and amoeboid pillow breccias are common but are destroyed within 300 m of the Elbow Lake–Iskwasum Lake shear zone (unit W6a) that follows the central part of the Grass River into the Cranberry lakes to the west and Iskwasum Lake to the south. The McDougalls Point basalt displays geochemical characteristics of a normal mid-ocean ridge basalt (N-MORB) with a small crustal component; it was probably erupted in an ensimatic back-arc basin (Stern *et al.*, 1995; Syme, 1994).

The Claw Bay basalt (unit F1b) and derived Centre Lake mafic tectonite (unit W6b) occur in the Claw Bay area SE of Elbow Lake (NTS 63K15) and extend south into the Iskwasum Lake map-sheet east of the Iskwasum Lake shear zone. This basalt displays similar N-MORB characteristics to, but is lithologically and geochemically distinct from the McDougalls Point basalt (Syme, 1992, 1994; Stern *et al.*,1995).

The Fourmile Island sequence (units J1a, J3a, J4a, J5c, J13c) occurs in the western and central part of Reed Lake, and has been divided into six lithologic assemblages that top uniformly towards the north (Syme *et al.*, 1995). The character of this sequence is summarized in Table 2.

Field mapping indicates that the Fourmile Island assemblage is a relatively proximal oceanic arc succession dominated by thick mafic flows and synvolcanic dykes. Felsic to intermediate volcaniclastic units may be calc-alkaline intra-arc basinal accumulations deposited proximal to volcanic centres: synvolcanic feeder dykes, lava flows and exogenous felsic domes occur within this predominantly clastic part of the assemblage (Syme *et al.*, 1995). The Fourmile Island Copper (Reed Lake Copper) and Spruce Point (NTS 63K/9) volcanogenic massive sulphide deposits are hosted by this sequence.

Intrusive rocks

Rocks of the Flin Flon supracrustal collage are interspersed with 1876 to 1845 Ma granitoid plutons that occupy >60% of the belt (Morrison and Whalen, 1995). Major plutons of the Iskwasum Lake map-area are shown on MDS Map No. 31, and their character is summarized in Table 3.

The Gants Lake batholith (units P5a, P6d, P6f, P7a, P7b, P11a) occupies the boundary zone between the Claw Bay basalt ocean floor volcanic assemblage to the west and the Fourmile Island arc assemblage to the east. The Loucks Lake shear zone, which is located dominantly within the batholith, may be the trace of the contact zone between these diverse supracrustal assemblages.

The Reed Lake mafic-ultramafic complex (units F6c, F6d, P2a) is a 4x10 km, compositionally zoned, mafic-ultramafic intrusion located west of Reed Lake. The age of this complex has not been determined. Its geochemical similarity to other intrusions associated with the Elbow–Athapapuskow ocean floor assemblage (Stern *et al.*, 1995) exposed on Elbow Lake, Claw Lake (NTS 63K15), Athapapuskow Lake (NTS 63K11 and 12) and Iskwasum Lake (NTS 63K10) suggest that its emplacement may have been synvolcanic. If this is the case, the Reed Lake complex is a "mega-boudin" within the Reed Lake–North Star shear zone.

The Fourmile Island tonalite (unit J12), recently described by Syme *et al.* (1995), is a 1 x 4 km highly altered and deformed pluton emplaced in Fourmile Island assemblage volcanic rocks. A penetrative foliation is preserved, and the intrusion contains common ductile shear zones, brittle fracture sets and abundant quartz veins. Several gold occurrences are located in the tonalite on Fourmile Island (Rousell, 1970; Stewart, 1977; Heine, 1993).

The Josland Lake gabbro (Bailes, 1980) comprises a distinctive suite of zoned, strongly fractionated, tholeiitic, gabbroic sills (units P3a, P3b, P3c) displaying extreme iron enrichment. Four of these sills, ranging from 200 to 1700 m thick, occur along the WNW side of Reed Lake and extend into the File Lake area (NTS 63K16) (Bailes, 1980). The thickest sill, east of Sewell Lake, can be traced along strike for >17 km (Syme *et al.*, 1995).

The Iskwasum mafic/ultramafic intrusive complex (units F6a, F6b) is a stratiform intrusion emplaced in the Centre Lake mafic tectonite along the east side of the Iskwasum Lake shear zone. It is truncated to the NE by the Elbow Lake pluton (unit P6a), and extends south from

TABLE 2: STRATIGRAPHIC SUBDIVISION OF THE SUPRACRUSTAL ASSEMBLAGE OF THE REED LAKE AREA, NTS 63K10 (ISKWASUM LAKE).

unit 'A'	pillowed and massive aphyric massive flows
unit 'B'	heterolithologic breccia with subrounded, amygdaloidal, aphyric and plagioclase-phyric,intermediate to mafic clasts, minor quartz-phyric rhyolite cobbles and boulders, rare sandy interbeds and thin intermediate to mafic pillowed flows
unit 'C'	heterogeneous assemblage dominated by thin, pillowed, aphyric and plagioclase-phyric intermediate to mafic flows and amoeboid pillow breccia cut by synvolcanic dykes, rare interbeds of chert-hematite iron formation, local coarsely quartz-feldspar phyric, fragmental rhyolite (exogenous felsic dome)
unit 'D'	heterogeneous assemblage dominated by intermediate to felsic fragmental rocks basal part is locally a quartz-feldspar phyric rhyolite flow or dome grading upward to felsic breccia also get thin, pillowed, mafic to intermediate flows in basal part top of sequence contains thin-bedded, pebble- to sand-sized tuff layers gradational contact with underlying unit 'C'
unit 'E'	aphyric, pillowed and massive mafic flows showing abrupt contact with underlying unit 'D' top contact arbitrary -base of a Josland Lake gabbro sill characterized by large pillows, carbonate-filled amygdules cut by series of rhyolite dykes displays variable alteration: epidotization, silicification
unit 'F'	pillowed and subordinate massive, aphyric to plagioclase phyric mafic flows, diabase dykes may be continuation of unit 'E' - occurs along top of a Josland Lake gabbro sill variable quatities of quartz-, epidote- and carbonate-filled amygdules variably silicified

TABLE 3: MAJOR INTRUSIONS OF NTS 63K10 (ISKWASUM LAKE).

Name	**Age** (Whalen and Hunt, 1994)	**Petrography** (Bailes, 1980; Whalen, 1993; Syme *et al.*, 1995; Morrison and Whalen, 1995)
Little Swan Lake pluton	1826±5 Ma	coarse-grained, hornblende-biotite granodiorite, quartz diorite, diorite, gabbro
Big Rat Lake Pluton	1845±3 Ma	fine- to medium-grained biotite granite to granodiorite and medium- to coarse-grained, biotite granite to granodiorite
Elbow Lake tonalite	1864+5/-3 Ma	quartz-biotite porphyritic, biotite±hornblende tonalite
Gants Lake batholith	1876+7/-6 Ma	plagioclase porphyritic, hornblende-biotite granodiorite; other comagmatic phases present
Iskwasum mafic-ultramafic intrusive complex	1901 Ma	heterogeneous gabbro, gabbroic pegmatite, serpentinite, talc-carbonate-hematite schist
Reed Lake mafic-ultramafic complex (Reed Lake pluton)	1901 Ma (?)	
Lower zone		pyroxenite and gabbro
Middle zone		gabbro and melagabbro
Upper zone		pyroxenite, melagabbro, quartz gabbro, quartz melagabbro, tonalite
Iskwasum Lake stock		leucocratic biotite tonalite
South Iskwasum Lake pluton		
southern section		homogeneous biotite-hornblende granodiorite
northwest section		K-feldspar porphyritic granodiorite, equigranular biotite-hornblende granodiorite, hornblende-quartz monzonite, hornblende-biotite granodiorite
Fourmile Island tonalite		equigranular to weakly quartz-phyric leucotonalite and tonalite to granodiorite

NOTE: units in this table are not in chronologic order

Barb Lake, through the islands of Iskwasum Lake, and along the east side of the Grass River. A discontinuous band of these rocks extends NE along the Iskwasum Lake shear zone (Grass River strand of the Elbow Lake shear zone). The lithologic similarity of layered gabbro-pyroxenite-peridotite intrusive complexes and their position within Claw Bay basalt/Centre Lake mafic tectonite along the west, east and south sides of the Elbow Lake pluton suggest that they may originally have been part of a single stratiform intrusion. Preliminary radiometric dates indicate that the gabbroic complexes are the same age as ocean floor basalts in the Athapapuskow–Elbow segment of the belt (Stern *et al.*, 1995). The distribution of these intrusions is evident on both the total field and vertical gradient aeromagnetic maps of the area (Geological Survey of Canada, 1983a, b).

Structural geology

The major structures of the Iskwasum Lake area have been described by Syme (1994), and his results are summarized in Tables 4 and 5. The Iskwasum Lake shear zone (Syme, 1991, 1992) continues to the SSE from Elbow Lake (NTS 63K15) and follows a curving course along the Grass River into the central and southwestern part of Iskwasum Lake, where it is truncated by the Berry Creek fault. It ranges from 60 to 900 m thick on Iskwasum Lake and thins considerably in the northern part of the map-area. For most of its strike length, the shear zone forms a tectonic boundary separating lithologically and geochemically distinct units, specifically McDougalls Point basalt in the west from the Centre Lake mafic tectonite and Iskwasum mafic-ultramafic complex to the east. This is the same situation as has been noted in the Elbow Lake area. However, in the area where the Grass River enters the north end of Iskwasum Lake, the shear zone is bounded on both sides by McDougalls Point basalt. The movement history along this break is complex (Ryan and Williams, 1995, 1999). Shear indicators in the Iskwasum Lake area show dominant sinistral displacement but local dextral kinematic indicators are also present.

The Loucks Lake shear zone is a north-trending structure in the Gants Lake batholith. It consists of a variety of banded mylonitic rocks derived mainly from felsic granitoid lithologies and has been the locus of multiple intrusive and deformational episodes.

The East Iskwasum shear zone is a curvilinear north-trending structure exposed in eastern Iskwasum Lake and extending into the Barb Lake area. It transects portions of the Centre Lake tectonite and Iskwasum mafic/ultramafic complex. It is approximately 50 m thick in the north and thickens to approximately 450 m at its southern limit, where it is truncated by a NE-trending shear zone.

Several south-trending faults splay from the Iskwasum Lake shear zone where it has been folded to a southeasterly orientation along the Grass River SSW of the outflow from Elbow Lake. The majority of these faults show dextral offsets, and significant changes of unit orientations and thicknesses indicate a vertical component to the displacement. The nature of the faulting ranges from discrete (brittle) zones to ductile shears.

The Berry Creek Fault is an arcuate regional structure that has been traced for more than 150 km from Wekusko to Athapapuskow lakes. In the Iskwasum Lake area it is located just south of the scarp that marks the edge of the Palaeozoic carbonate rocks (Manitoba Energy and Mines, 1992), and is a distinct feature on the 1:50 000 vertical gradient aeromagnetic map of the area (Geological Survey of Canada, 1983a). Dextral movement along the Berry Creek Fault has deflected the Iskwasum Lake and Loucks Lake shear zones, and the Gants Lake batholith into westerly orientations. These effects occur within 2 to 3 km of the fault.

A 240 m thick, northeast-trending shear zone, coplanar with the Iskwasum Lake shear zone in this area, truncates the south end of the East Iskwasum shear zone at southernmost Iskwasum Lake. It borders the NW margin of the Gants Lake batholith, where it has been folded into a NE-SW attitude by the Berry Creek Fault.

The East Iskwasum Fault is a late, north-trending, linear structure along the east shore of Iskwasum Lake. Ductile deformation along a 60 to 100 m thick interval has developed a tectonic lamination and local mylonitic fabric in gabbro. It appears to be truncated by the northeast-trending shear zone (above), and cuts across the portion of the Gants Lake batholith that was transposed into a southwesterly orientation by the Berry Creek fault. The vertical gradient aeromagnetic map (Geological Survey of Canada, 1983a) indicates a 500 m sinistral offset of the Berry Creek Fault where it intersects the extrapolated position of the East Iskwasum Fault.

The major structures of the Reed Lake area are summarized in Table 5. The NNE- trending West Reed–North Star shear zone (Syme *et al.*, 1995) is a major structural feature in the supracrustal assemblage of the Iskwasum Lake map-area west of Reed Lake. To the north it is more or less correlative with the sheared Central Zone rocks in the North Star Lake area (Norquay and Halden, 1992; Norquay *et al.*, 1992; 1993; 1994) and the Reed–North Star high strain zone near Dow Lake in the Elbow Lake area (NTS 63K/15) (Zwanzig, 1995). It disappears under Palaeozoic cover to the south and has been traced along strike for more than 25 km. This shear zone, up to 5.5 km thick, separates the Fourmile Island volcanic assemblage to the east from the Reed Lake mafic-ultramafic complex. The West Reed–North Star shear zone is the site for the syntectonic emplacement of sheets of quartz-plagioclase phyric intermediate-felsic rock (Syme *et al.*, 1995). The shear zone developed primarily in basalt that is part of the Fourmile Island assemblage, but the eastern margin of the Reed Lake mafic-ultramafic complex is also sheared. The West Reed-North Star shear zone was reactivated during D_3 deformation.

Recent investigations of the of the volcanic rocks of the Snow Lake area indicates that they are significantly different from those of the main Flin Flon assemblage.

TABLE 4: SUMMARY OF STRUCTURAL ELEMENTS OF THE ISKWASUM LAKE AREA, NTS 63K10 (from Syme, 1994).

Generation	Trend	Structures, fabrics
S_0	N - NNE	primary bedding and flow contacts in McDougalls Point basalt
S_1 $_0$	N - NNE	weak bedding-parallel foliation in McDougalls Point basalt north-trending foliation in Iskwasum mafic complex, Centre Lake mafic tectonite
S_2	Folded: NE, WNW, NW, NNE	Iskwasum Lake shear zone on Iskwasum Lake forms dominant mylonite/tectonite fabric on Iskwasum Lake associated penetrative foliation extends >1 km into wallrocks
S_3	NNW, N	north-trending East Iskwasum shear zone
S_4	N	south-trending faults splaying from Elbow Lake shear zone in the Grass River
S_5	W	dextral fault/shear in Berry Creek fault associated east-northeast -trending F_5 folds in Loucks Lake mylonite, S_5 axial planar spaced fractures, S_5 ultramylonite zones adjacent to Berry Creek fault on southern Iskwasum Lake, west-trending spaced fabric in Gants Lake batholith within 2 km of Berry Creek fault
S_6	NE	northeast-trending regional cleavage, possibly same generation as S_7
S_7	NE	northeast-trending shear zone, southern Iskwasum Lake
S_8	N	East Iskwasum fault

TABLE 5: SUMMARY OF STRUCTURAL EVENTS AND ELEMENTS OF THE REED LAKE AREA, NTS 63K10 (from Syme *et al.*, 1995).

Event	Structures	Trend	Structures, fabrics
D_1	S_1	N	West Reed-North Star shear zone
D_2	S_2, F_2	arcuate	Morton Lake fault zone (possibly out-of-sequence thrusts) in NTS 63K9
D_3	S_3, F_3	N, NE	West Reed-North Star shear zone, possibly early Berry Creek shear
D_4	S_4	NW	F_4 crennulation cleavage
D_5		E	brittle/ductile deformation along Berry Creek fault zone

Structural investigations have revealed that the Snow Lake assemblage forms an allochthonous sequence that has been thrust to the southwest over the autochthonous Flin Flon collage (Kraus and Williams, 1999). The basal sole of this thrust appears to be the Morton Lake fault zone, located along the eastern margin of the Iskwasum Lake map-area.

Economic geology

Exploration for and evaluation of the mineral resources of the area was initiated by the discovery and small-scale exploitation of gold in quartz veins on Fourmile Island (occurrence 13). The gold-bearing quartz veins are located in tension fractures within the Fourmile Island tonalite. Other evidence of hydrothermal effects within the tonalite is indicated by areas of carbonate and phyllosilicate alteration. Several quartz veins in other areas appear to have been investigated for their gold potential, including occurrences 1, 8, 12, 21, 24 and 27.

Most of the mineral exploration efforts to date have been directed towards the discovery of volcanogenic massive sulphide type deposits. Some success has been achieved with the discovery of the Fourmile Island copper (occurrence 14) and the Rail Lake deposits (occurrence 16). Neither of these deposits has any surface expression, their discovery being the result of

follow-up work to geophysical surveys. Numerous electromagnetic responses along the northwest side and under Reed Lake have been drill tested, but, to date, only disappointing results have been reported. The cause of the conductive responses consists dominantly of barren sulphides commonly associated with graphite.

The Reed Lake mafic complex (occurrence 26) has only received a cursory examination with respect to its potential for hosting base metal and/or platinum group element (PGE) mineralization (A.F. 93097; Williamson, 1993). A detailed airborne magnetic survey indicated that parts of the intrusion show a well-defined layered character, suggesting that it had undergone primary magmatic differentiation (Williamson, pers. comm.). Williamson and Eckstrand (1995) suggested that the PGE and nickel potential for this intrusion is low because of the low sulphur fugacity of the magma, reflected by the low quatities of disseminated sulphides and the negative correlation between Pt, Pd and Ni, and sulphur. Recent work by Arc Metals (Sawitzky, pers. comm., 2001) has indicated that some parts of the Reed Lake mafic complex are sulphide-rich, and additional exploration activity may be warranted.

Iskwasum mafic-ultramafic intrusive complex follows the long axis of Iskwasum Lake and Grass River north to almost the northern boundary of the NTS sheet. These rocks occur at the boundary between Claw Bay basalt to the east and McDougalls Point basalt to the west. Although both show N-MORB characteristics, they are lithologically and geochemically distinct. Disseminated nickel mineralization has been found in the Law zone (occurrence 25) under the north end of Iskwasum Lake. It occurs both as disseminated millerite with lesser pyrrhotite in serpentinite, and also in the silicate phase of the intrusion. The geophysical target for the drill programme is a magnetic high. Several trenched areas were found during the examination of this NTS area (occurrences 3, 4 and 7), but no record has been found describing the target for these efforts. The proximity of these excavations to the mafic-ultramafic complex suggests the targets were associated sulphide mineralization.

A number of talc occurrences (grouped under occurrence 42) are located within pyroxenites, peridotites and serpentinites (unit F6b) of the Iskwasum mafic-ultramafic intrusive complex. None of these have been properly evaluated for their economic potential.

Brittle asbestos (picrolite?) occurs in altered serpentinite at occurrence 6. This mineral occurs as fracture fillings in gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum mafic-ultramafic complex.

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LOCATION: 1

NAME: Little A and Big A
UTM: 375520 E, 6067485 N
AREA: along west side of Grass River at rapids south of abandoned railway bridge
ACCESS: via bush plane or boat through the Cranberry Lakes and Elbow Lake from Cranberry Portage and traverse
AIRPHOTO: MB90025-130

EXPLORATION SUMMARY

The occurrence was staked in 1920 by Mr Thomas Hanna who excavated several trenches along the west side of the river (Stockwell, 1935). In 1964 Mrs. M.D. Parres staked 4 claims (Rain #11 to #14) over the area. In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Some trenching was undertaken before the claims were cancelled in 1966 (Mineral Inventory File #733). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). In 1978 Gränges Exploration AB staked CB 10102 over the property. Work undertaken consisted of geophysical surveys (HLEM) followed by diamond drilling in 1981 and 1982 (Mineral Inventory File #733; A.F. 93256).

One overgrown trench was located in the bush approximately 15 m NNE of the quartz vein exposed along the west shoreline of the Grass River.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 1-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The rocks in the vicinity of the occurrence consist mainly of mafic schist (unit W6) that is the southern extension of the Elbow Lake shear zone (Galley *et al.*, 1987, 1989; Syme, 1990, 1991, 1992, 1994). The mafic schist is intruded by a fine-grained pink granitic rock, possibly related to tonalite (unit P6) of the Elbow Lake pluton. The granitic rocks trend parallel to the schistosity. Disseminated, <2 mm, euhedral pyrite grains are common in the intrusive rock.

MINERALIZATION

A quartz vein, up to 7 m thick, is exposed along the west side of the Grass River at the foot of the first rapids below the railway bridge. The vein strikes 225°, dips 75°NW 75°NW and is hosted by mafic schist. It consists dominantly of milky quartz with minor brown-weathering carbonate. No sulphides were noted either in the vein or in quartz fragments from the muck pile at the trench. Discontinuous quartz veins up to 2 cm thick occur in pink granitic cobbles and boulders in the stream bed several tens of metres northeast of the main quartz vein.

GEOCHEMICAL DATA

Stockwell (1935) reported that the owner obtained an assay of 0.16 oz. Au/ton (5.5 g Au/t) from a 40 foot channel sample collected in a large trench approximately 200 ft. (60 m) NE of the quartz vein at the foot of the rapids. The owner also obtained assays of 0.15 to 0.35 oz. Au/ton (5.1 to 12.0 g Au/t) from trenches in sulphide-bearing quartz veins that reportedly occur southwest of the main occurrence.

CLASSIFICATION

Vein type deposit; multiple veins or lenses. Quartz veins occur in schist that is part of the Elbow Lake shear zone.

REFERENCES

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Mineral Inventory File No. 733

Manitoba Energy and Mines, Geologic Services

NATMAP Shield Margin Project Working Group

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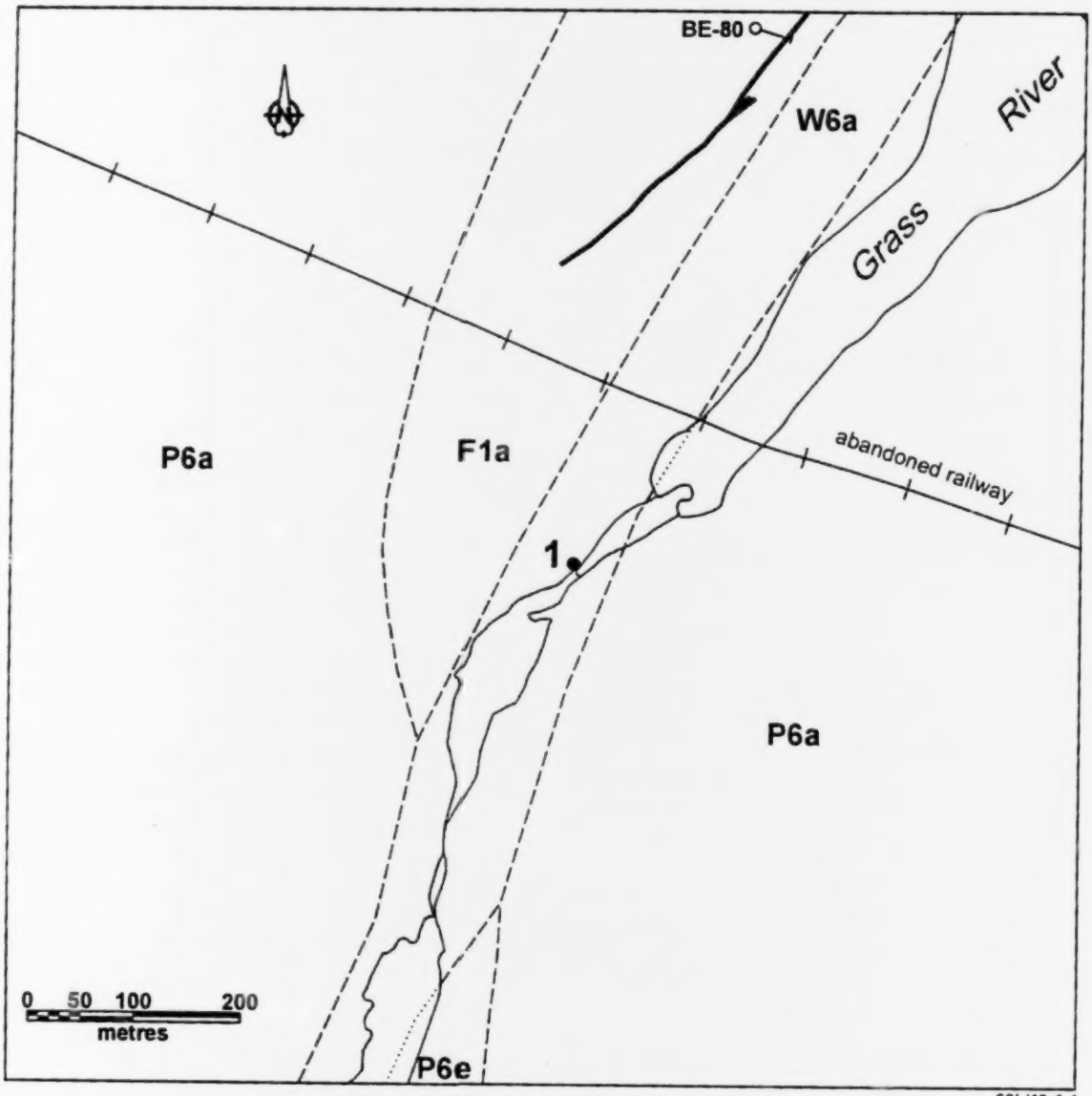

PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P6e — Tonalite: xenolith-rich phase
- P6a — Tonalite
- F1a — McDougalls Point pillowed and massive basalt, diabase?

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 93256)
- Drillhole (A.F. 93256)
- 1 — Mineral occurrence location

Figure 1-1: Geological setting of Little A and Big A occurrence.

LOCATION: 2

NAME:
UTM: 373975 E, 6067995 N
AREA: approximately 500 m west of western railway bridge over Grass River
ACCESS: via boat through the Cranberry Lakes from Cranberry Portage and traverse
AIRPHOTO: MB90025-209

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970, p.29) indicated that minor chalcopyrite mineralization was present in this area. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). No direct exploration has been recorded for this occurrence.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 2-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by ocean floor pillowed basalt flows sills of the McDougalls Point basalt (unit F1a), and include synvolcanic diabase dykes and and lesser volcaniclastic and epiclastic metasedimentary lithologies. These rocks are transected by mafic phyllonite and cataclasite (unit W6c) of the Iskwasum Lake shear zone. The supracrustal and associated sequence is bounded to the SE by tonalite (unit P6a) and the NW by granite to granodiorite (unit P9b) of the Elbow Lake pluton.

The exposures at the occurrence, along the north side of the railway right-of-way, contain well foliated fine-grained metasedimentary and mafic metavolcanic rocks that are pillowed in part. The metasediments are finely laminated in places, with the lamination trending 051° and dipping 73° SE. Rocks at the occurrence are limonitic and tend to be fissile, with the fissility trending parallel to the lamination. They are cherty in part and grade into silicate facies iron formation. It is unclear from the exposures whether the lamination is primary or tectonic. A grey, fine-grained, massive fragmental mafic rock is exposed to the east. Lithic fragments similar to the adjacent metasedimentary rocks are commonly stretched parallel to the foliation and average 100x8 mm. The laminated metasediments exposed in the cut south of the railway right-of-way are crosscut by irregularly-striking diabase dykes.

MINERALIZATION

The railway cuts contain thin chert and magnetite laminae. Pyrite and pyrrhotite stringers to 10 mm thick are common and parallel the lamination. The amount of limonite on the weathered outcrop surface suggests that the rocks contain a higher amount of fine-grained pyrite than is apparent in hand sample. The metasedimentary units also contain up to 3% disseminated, equant pyrite grains. Hunt (1970) indicated that minor chalcopyrite is present. Minor disseminated molybdenite occurs in the diabase that crosscuts the metavolcanic and metasedimentary rocks.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Chemical-sediment type deposit, silicate facies iron formation.

REFERENCES

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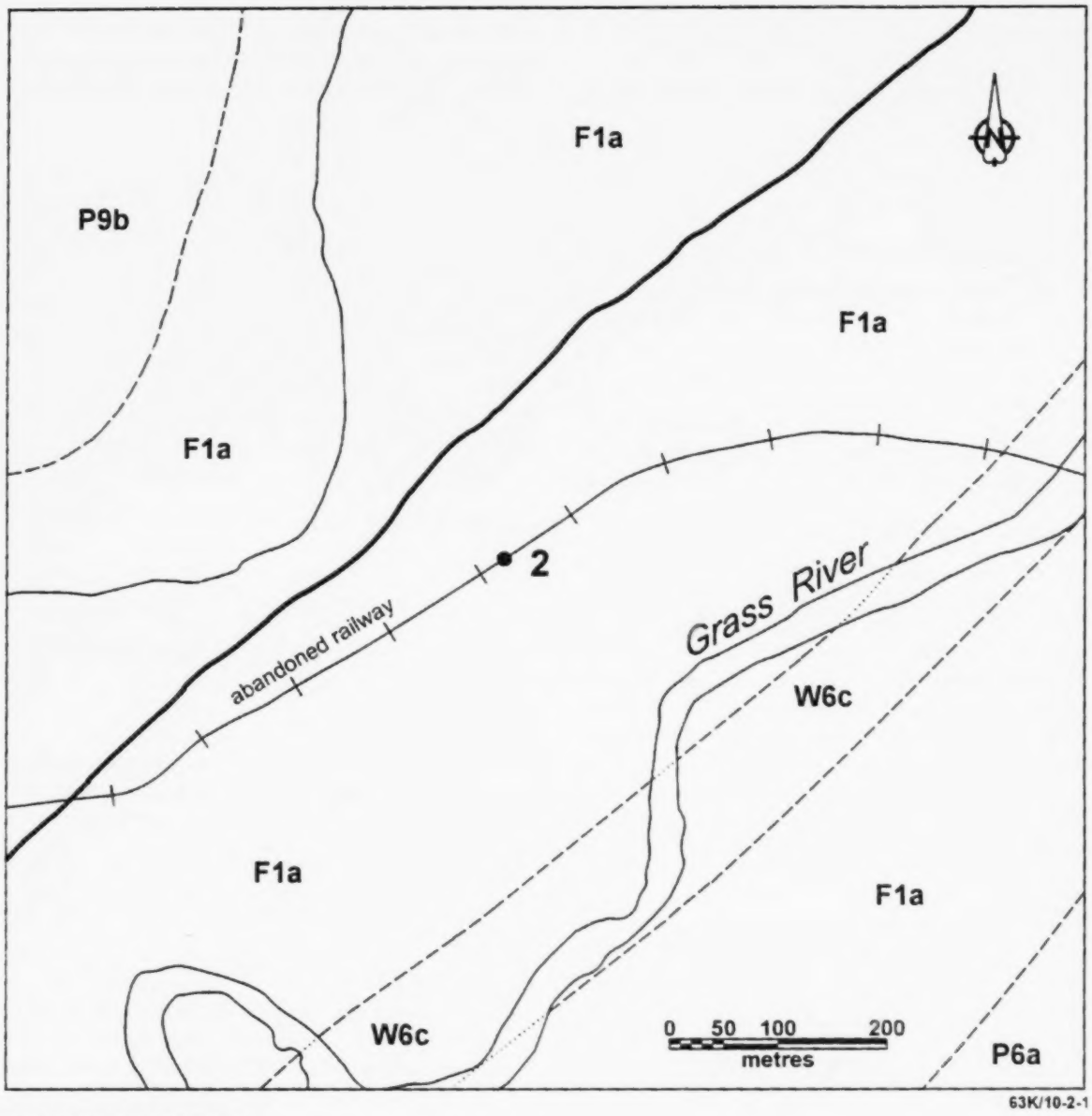


PALEOPROTEROZOIC

W6c	Mafic phyllonite ± carbonate, cataclasite
P9b	Granite to granodiorite
P6a	Tonalite
F1a	McDougalls Point pillowed and massive basalt, diabase?

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90282)

2 Mineral occurrence location

Figure 2-1: Geological setting of Occurrence 2.

LOCATION: 3

NAME:
UTM: 374585 E, 6065555 N
AREA: along east side of Grass river south of eastern railway bridge over Grass River.
ACCESS: via boat through Iskwasum Lake and Grass River and traverse
AIRPHOTO: A26398-157

EXPLORATION SUMMARY

In 1958 Barymin Explorations Limited conducted an HLEM (Ronka) survey that covered this occurrence (A.F. 90274). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). A magnetometer survey was conducted by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90277). Hunt (1970, mineral location #3, p.29) indicated several trenches had been excavated near the east shore of a large meander of the Grass River. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

Four trenches were located during the 1994 examination of the occurrence.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 3-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by Claw Bay basalt/Centre Lake mafic tectonite (unit F1b) (Syme, 1994). Mafic tectonite, phyllonite and mylonite (unit W6a) of the Iskwasum Lake shear zone are located to the west of the occurrence.

The trenches expose white to dark grey chert and cherty magnetite-bearing iron-formation up to 4 m thick that trends in a northerly direction and dips subvertically (Fig. 3-2). Individual chert bands are up to 25 cm thick. Accurate structural measurements could not be made because of the high magnetite content of the rocks.

MINERALIZATION

Pyrite occurs as disseminations in the chert and as discrete layers within the cherty magnetite iron-formation. Stringers, lenses and elliptical patches of smoky quartz occur within the schistose rocks, and the limonitic units contain up to 10% pyrite as small lenses and disseminations. Much of the sulphide has been oxidized and the rocks are intensely stained with iron oxides.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Chemical-sediment type deposit; silicate facies iron formation. Chert layers contain disseminated magnetite, and conformable layers and lenses of pyrite.

REFERENCES

A.F. 90274, 90277, 91564 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

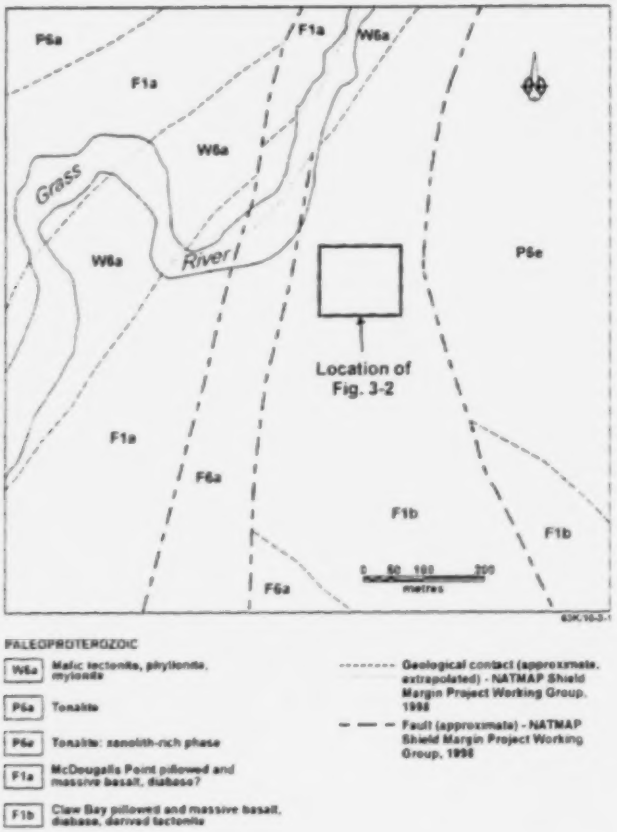


Figure 3-1: Geological setting of Occurrence 3.

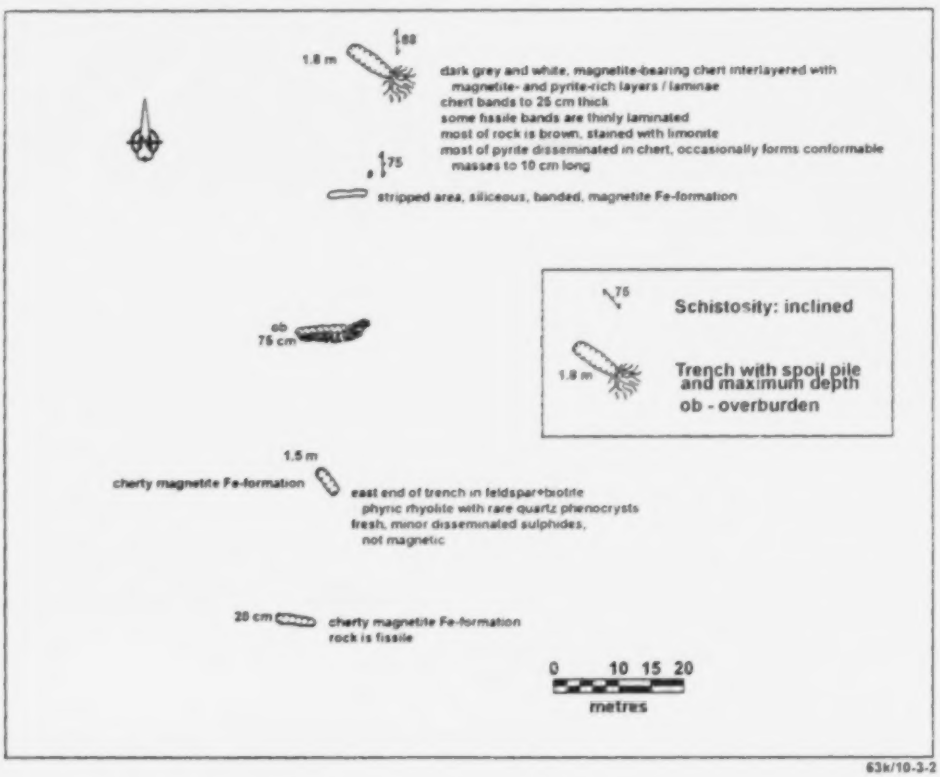

1.8 m
68
dark grey and white, magnetite-bearing chert interlayered with magnetite- and pyrite-rich layers / laminae
chert bands to 25 cm thick
some fissile bands are thinly laminated
most of rock is brown, stained with limonite
most of pyrite disseminated in chert, occasionally forms conformable masses to 10 cm long
75
stripped area, siliceous, banded, magnetite Fe-formation
ob
75 cm
75
Schistosity: inclined
1.8 m
Trench with spoil pile and maximum depth
ob - overburden
1.5 m
cherty magnetite Fe-formation
east end of trench in feldspar+biotite phyric rhyolite with rare quartz phenocrysts
fresh, minor disseminated sulphides, not magnetic
20 cm
cherty magnetite Fe-formation
rock is fissile
0 10 15 20
metres
63k/10-3-2

Figure 3-2: Geology and trench locations of Occurrence 3.

LOCATION: 4

NAME: "Bear Lake" occurrence
UTM: 376665 E, 6059365 N
AREA: west side of Grass River near NW end of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26327-8

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970, p.29) indicated several trenches had been excavated at the occurrence. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). This is one of a series of occurrences that appears to have been evaluated in the 1940's or 50's for its nickel(?) potential, but no exploration work appears to have been submitted for claims in the trench area.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 4-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by gabbro, gabbro pegmatite, and leucogabbro (unit F6a), which comprises part of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). It is located east of the Iskwasum Lake shear zone.

The trenches occur in gabbro at its contact with banded fragmental metavolcaniclastic rocks (Fig. 4-2). The gabbro is massive and unfoliated, and comprises 60% feldspar and 40% amphibole or pyroxene. Rare quartz-epidote veins to 6 cm thick cut the gabbro. A trench to the west of the gabbro exposes fine-grained banded rock with a fragmental appearance, and may have a volcaniclastic origin. The contact between the gabbro and the supracrustal unit is not exposed.

A small island along the west side of the Grass River south of the occurrence contains a fine-grained felsic dyke that trends parallel to the river channel. The western half of this island contains fine-grained, melanocratic, schistose, magnetite-rich rock that contains unfoliated lithic fragments. The foliation wraps around the fragments.

MINERALIZATION

Up to 2% magnetite is present as disseminated grains. Some of the magnetite is concentrated along fracture surfaces. The magnetite content of rocks in contact with the felsic dyke exposed in the island south of the main occurrence is greater than 50%. Pyrite is present as disseminated grains and fracture fillings and comprises up to 1% of the rock.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated.

REFERENCES

A.F. 91564, 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40pp.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

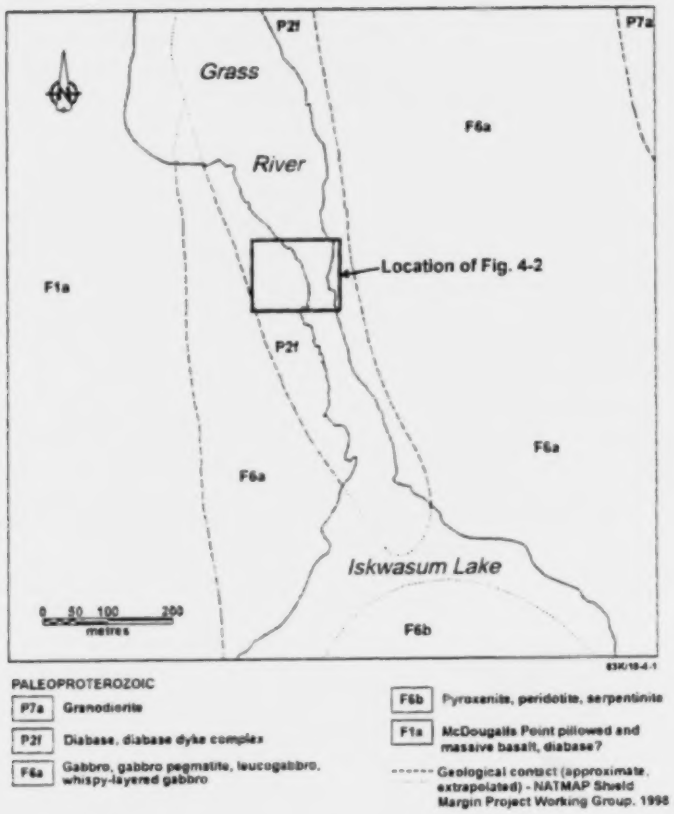


Figure 4-1: Geological setting of "Bear Lake" occurrence.

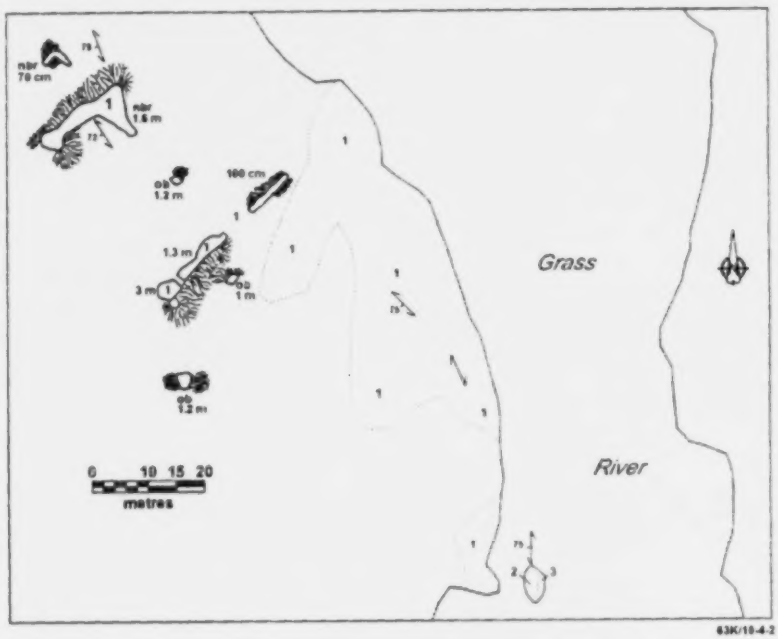


Figure 4-2: Geology and trench locations of "Bear Lake" occurrence.

LOCATION: 5

NAME:
UTM: 382845 E, 6056740 N
AREA: island at north end of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26326-80

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, after which an interpretation of the results was performed (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited undertook an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970, occurrence no. 5, p.30) indicated several trenches had been located at the occurrence, and that N. Stephanson and Associates had undertaken an electromagnetic survey and diamond drilled the occurrence in 1965. The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). No trenches have been excavated at this occurrence and open assessment files do not record any exploration work undertaken at this site.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 5-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) that forms part of tne Iskwasum mafic-ultramafic complex (Syme, 1994). It is located west of a mafic tectonite (unit W6a) that defines the East Iskwasum shear zone.

The occurrence is underlain by a fine-grained medium to dark grey mafic lithology. It is well foliated and shows numerous open to moderately tight folds. The rock shows patchy carbonatization as indicated by numerous deep (>15 cm) weathered pits on the outcrop surface. The carbonate parallels the foliation and outlines folds in the exposures.

MINERALIZATION

Several sulphide lenses 2 to 30 mm thick and composed of approximately 75% pyrite were located. These are conformable with the foliation. The lenses show only limited strike length and can be traced for about 20 cm. Disseminated pyrite up to 1% is common in the rocks. The pyrite grains are often elongated parallel to the foliation. Quartz stringers up to 5 mm thick and a few centimetres long are common.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Disseminated mineralization - not classified. Disseminated pyrite and pyrite lenses occur conformable with to banding in metasedimentary(?) or metavolcanic(?) rock.

REFERENCES

A.F. 91708, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

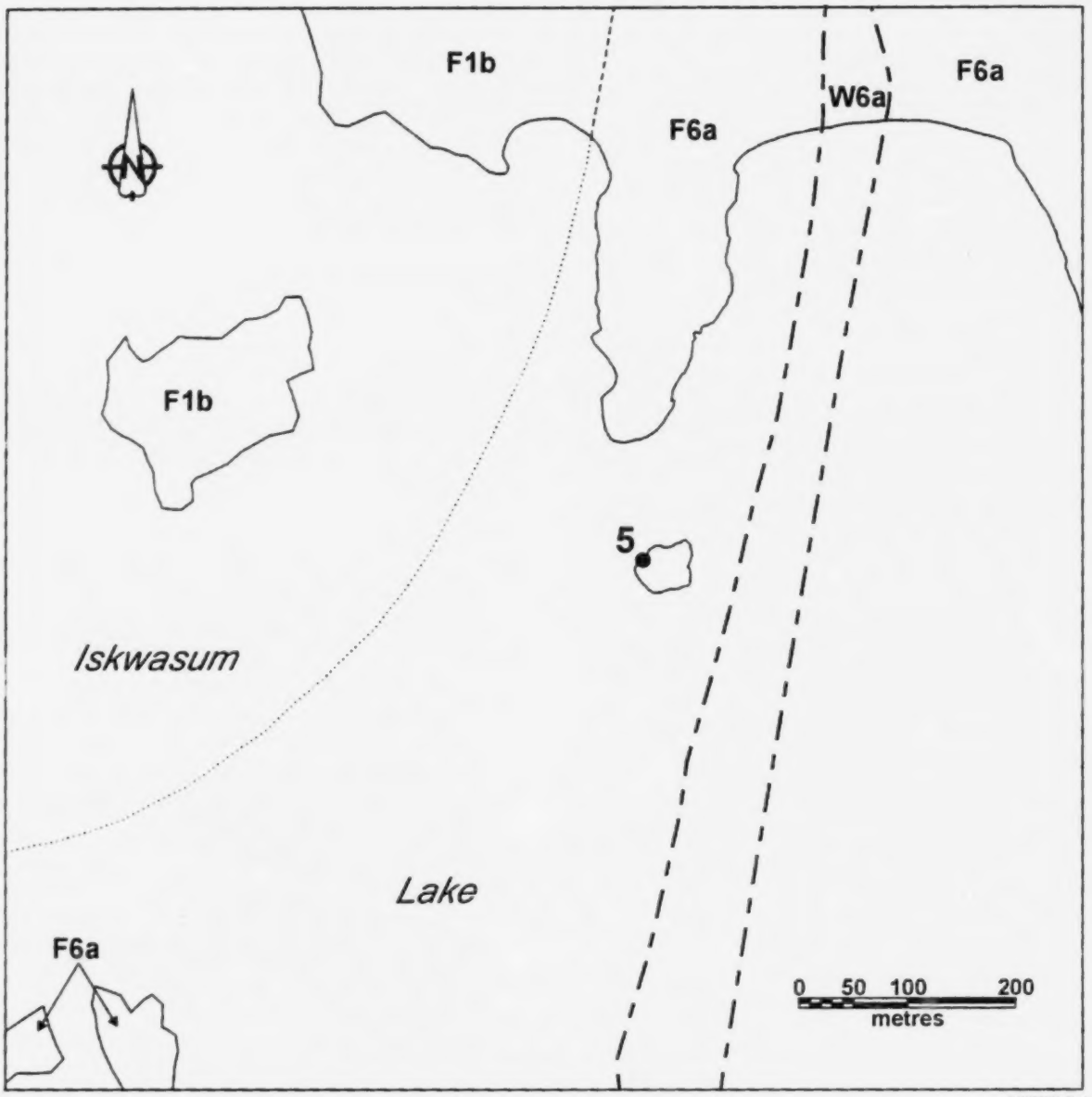
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

W6a — Mafic tectonite, phyllonite, mylonite

F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite

——— Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

– — – Fault location (approximate) - NATMAP Shield Margin Project Working Group, 1998

5 ● Mineral occurrence location

Figure 5-1: Geological setting of Occurrence 5.

LOCATION: 6

NAME: "Asbestos" occurrence
UTM: 377385 E, 6058155 N
AREA: north shore of west arm, Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26327-8

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited undertook an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970) indicates this occurrence on the geological map for this area. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

No trenches have been excavated at this occurrence and open assessment files do not record any exploration work undertaken at this site.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 6-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). It is bounded to the NE by mafic tectonite (unit F1b) derived from Claw Bay basalt.

The host lithology to the asbestos consists of massive pale light green-weathering talcose rock containing red and brown ferruginous patches. The rock is weakly magnetic and contains small magnetite grains. Talcose rock to the south has a well layered appearance, but the layering is a tectonically-induced feature (pers. comm., R. Syme, 1995). The shearing is probably related to the Iskwasum Lake shear zone.

MINERALIZATION

The asbestos is a brittle to semi-flexible variety, probably picrolite. It occurs as fibrous masses and aggregates to 3 cm long. The fibres are occasionally deformed and have formed across an irregular fracture network in the altered ultramafic rock. Some aggregates are aligned normal to the fracture walls. At the locality, picrolite makes up approximately 10% of the rock.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Replacement-type deposit. Asbestos in altered ultramafic rock.

REFERENCES

A.F. 91564, 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

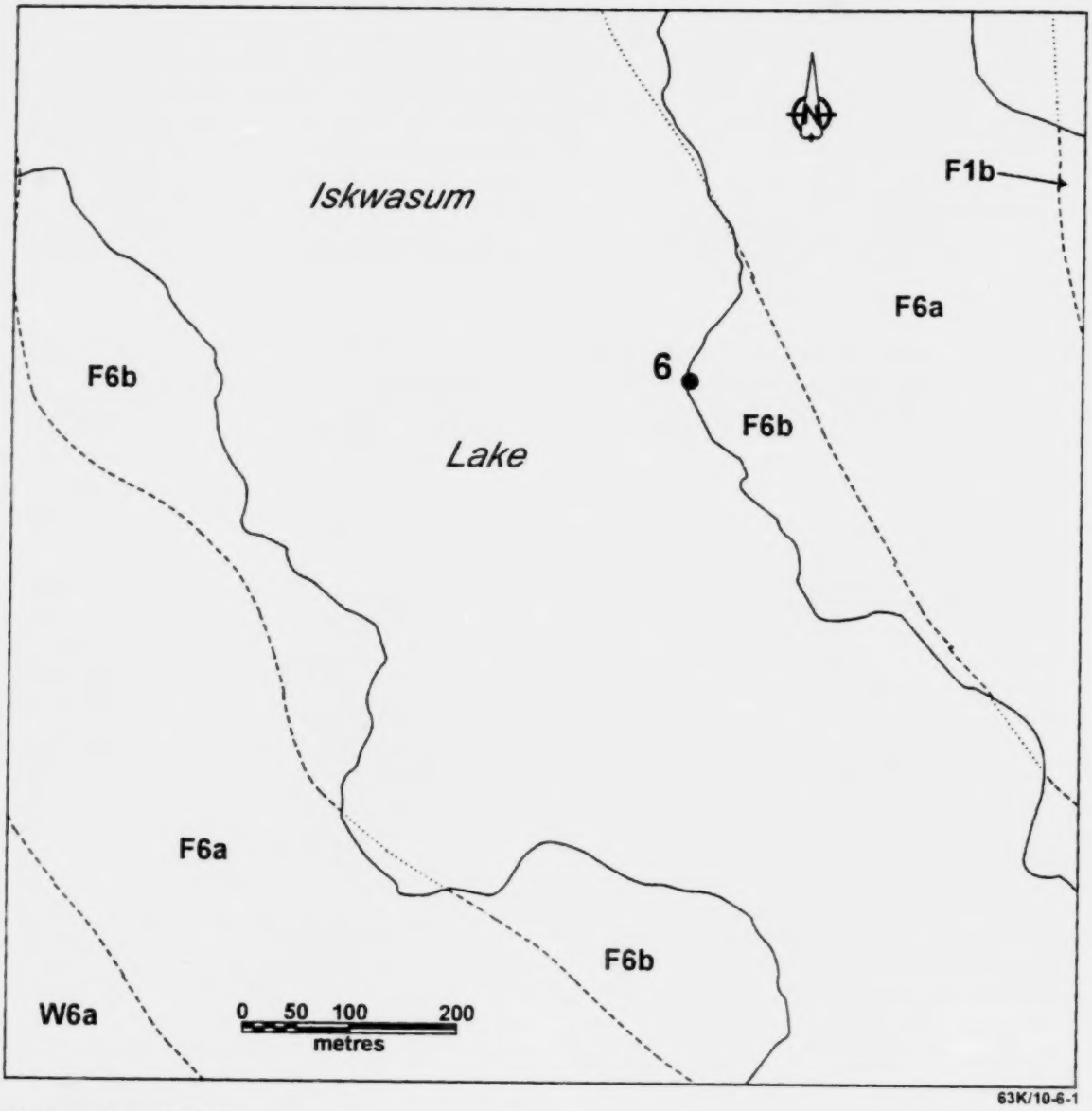
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

W6a	Mafic tectonite, phyllonite, mylonite
F6a	Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
F6b	Pyroxenite, peridotite, serpentinite
F1b	Claw Bay pillowed and massive basalt, diabase, derived tectonite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

6 ● Mineral occurrence location

Figure 6-1: Geological setting of "Asbestos" occurrence.

LOCATION: 7

NAME:
UTM: 379500 E, 6055665 N
AREA: south shore of west arm, Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26326-274

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, which included an interpretation of the results (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Although not specifically reported in assessment files, conductor axes of a ground EM survey undertaken prior to May 1967 are indicated in A.F. 90276. Hunt (1970, Map 65-3) indicated a mineral prospect at the occurrence location. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

Several trenches have been excavated close to the shoreline. This is one of a series of occurrences that appears to have been evaluated in the 1940's or 50's for its nickel(?) potential, but no exploration work has been submitted for claims in the trench area. Only two of the trenches expose bedrock.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 7-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The occurrence is underlain by mafic tectonite (unit W6a) of the Iskwasum Lake shear zone (Syme, 1994). Mafic to ultramafic rocks (units F6a and F6b) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994) occur to the north of the occurrence.

One of the trenches exposes the contact between coarse grained pyroxenite and fine grained dark grey-green fissile foliated rock (Fig. 7-2). The pyroxenite contains 70 to 90% pyroxene crystals up to 25 mm in a fine grained talcose matrix. Interstitial carbonate and brown weathering carbonate masses to 15 cm make up to 10% of the unit. The schistosity in the fine grained rock is probably related to the Elbow Lake shear zone.

MINERALIZATION

Pyrite, comprising less than 1% of the rock, occurs as disseminated grains in the pyroxenite. Limonitic zones in the trench walls suggest the former presence of pyrite stringers.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated.

REFERENCES

A.F. 90276, 91564, 91708 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

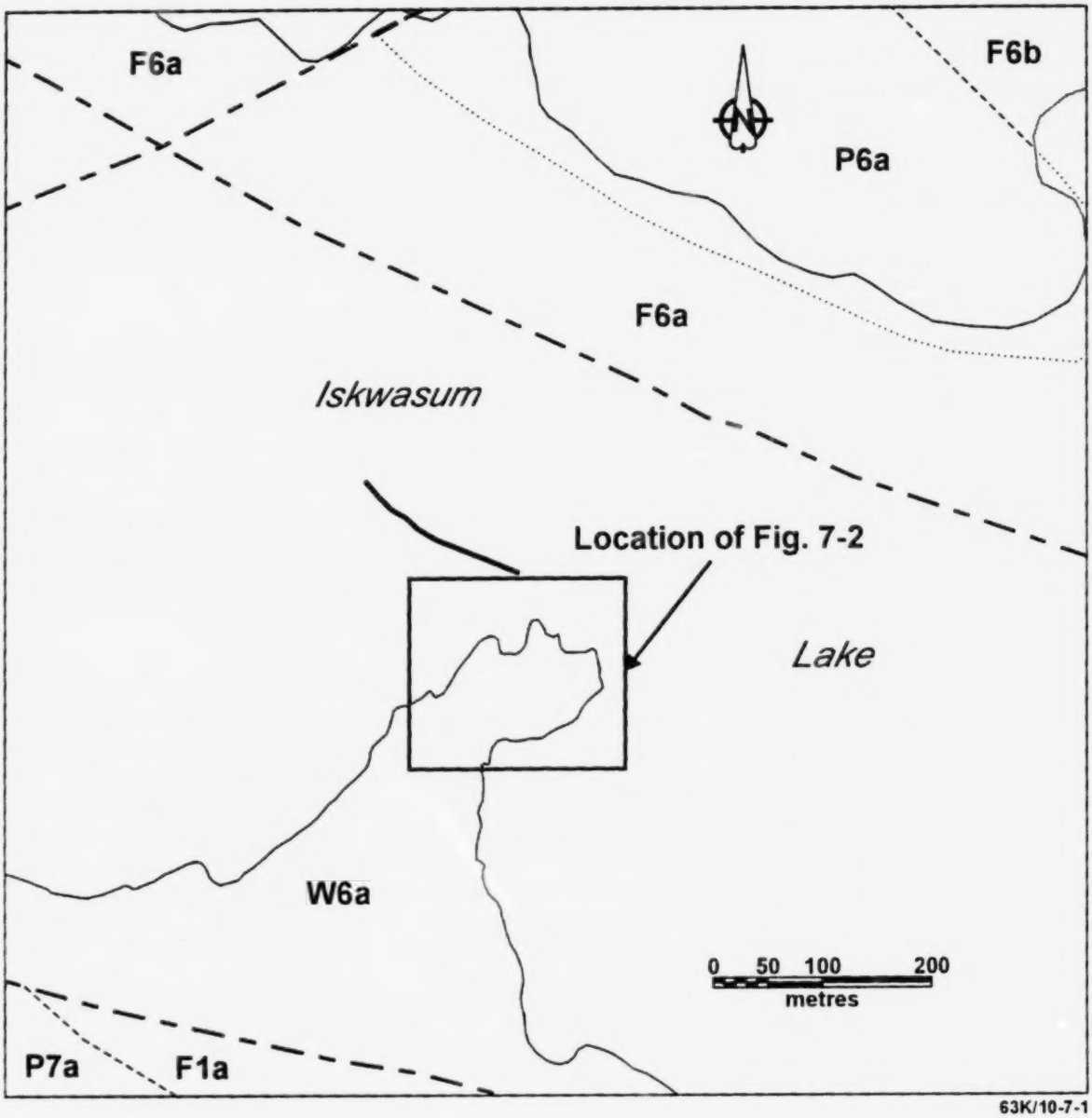
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P7a — Granodiorite
- P6a — Tonalite
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F6b — Pyroxenite, peridotite, serpentinite
- F1a — McDougalls Point pillowed and massive basalt, diabase?

- ------- Geological contact (approximate, exprapolated) - NATMAP Shield Margin Project Working Group, 1998
- — — Fault location (approximate) - NATMAP Shield Margin Project Working Group,1998
- ——— EM conductor (A.F. 90276)

Figure 7-1: Geological setting of Occurrence 7.

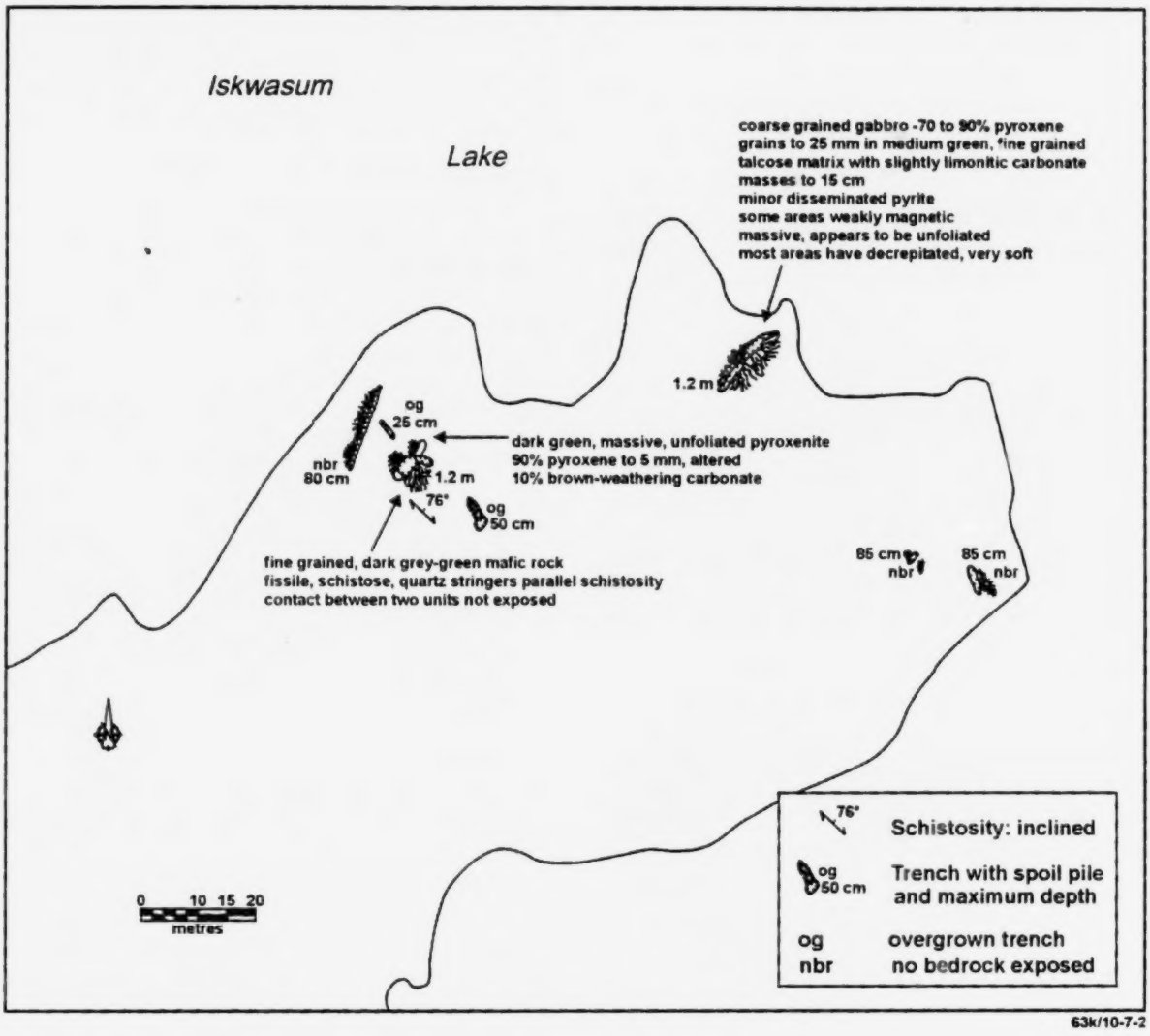


Figure 7-2: Geology and trench locations of Occurrence 7.

LOCATION: 8

NAME:
UTM: 381800 E, 6052900 N
AREA: west shore, south part of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26326-89

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, which included an interpretation of the results (A.F. 91708). In 1958 Barymin Explorations Limited conducted an HLEM (Ronka) survey that covered this occurrence (A.F. 90274). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). A magnetometer survey was undertaken by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90275). Hunt (1970, Map 65-3) indicated a mineral prospect at the occurrence location. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472).

Several now-overgrown trenches have been excavated close to the shoreline. One of the trenches appears to have been recently excavated. No work has been submitted for assessment purposes.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 8-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by the Macdougalls Point basalt (unit F1a) (Syme, 1994). Mafic tectonite, phyllonite and mylonite (unit W6a) of the Iskwasum Lake shear zone occurs to the SE. Granodiorite (unit P7a) of the South Iskwasum Lake pluton occurs approximately 500 m west of the occurrence.

The trenches at the occurrence are shown in Fig. 8-2. At the occurrence the dominant host rock is a melanocratic, fine grained, well foliated lithology. Mafic lithic fragments(?), to several centimetres, are present in some areas. It is unclear if these are primary volcaniclastic features or have a tectonic origin. The unit is calcareous and has deeply weathered pits that emphasize its intensely folded character. The mafic rocks are cut by a series of feldspar porphyry dykes, 3 to 75 cm thick, that have been broadly folded. The dykes commonly show small dextral offsets along late fractures.

MINERALIZATION

A >15 m thick quartz vein is discontinuously exposed in outcrop and trenches at this location. The vein is composed dominantly of milky quartz with accessory pyrite, fuchsite and black tourmaline (schorl?). These constituents are present in minor amounts, but locally bands and aggregates of euhedral pyrite grains can comprise up to 60% of the vein material. Quartz veins extending under Iskwasum Lake have been noted a short distance offshore north of the mainland exposures. These veins mimic the tight fold style of the host rock.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Vein type deposit; single vein. Quartz vein with pyrite, fuchsite and schorl, suggesting that it has some gold potential.

REFERENCES

A.F. 90274, 90275, 91564, 91708, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

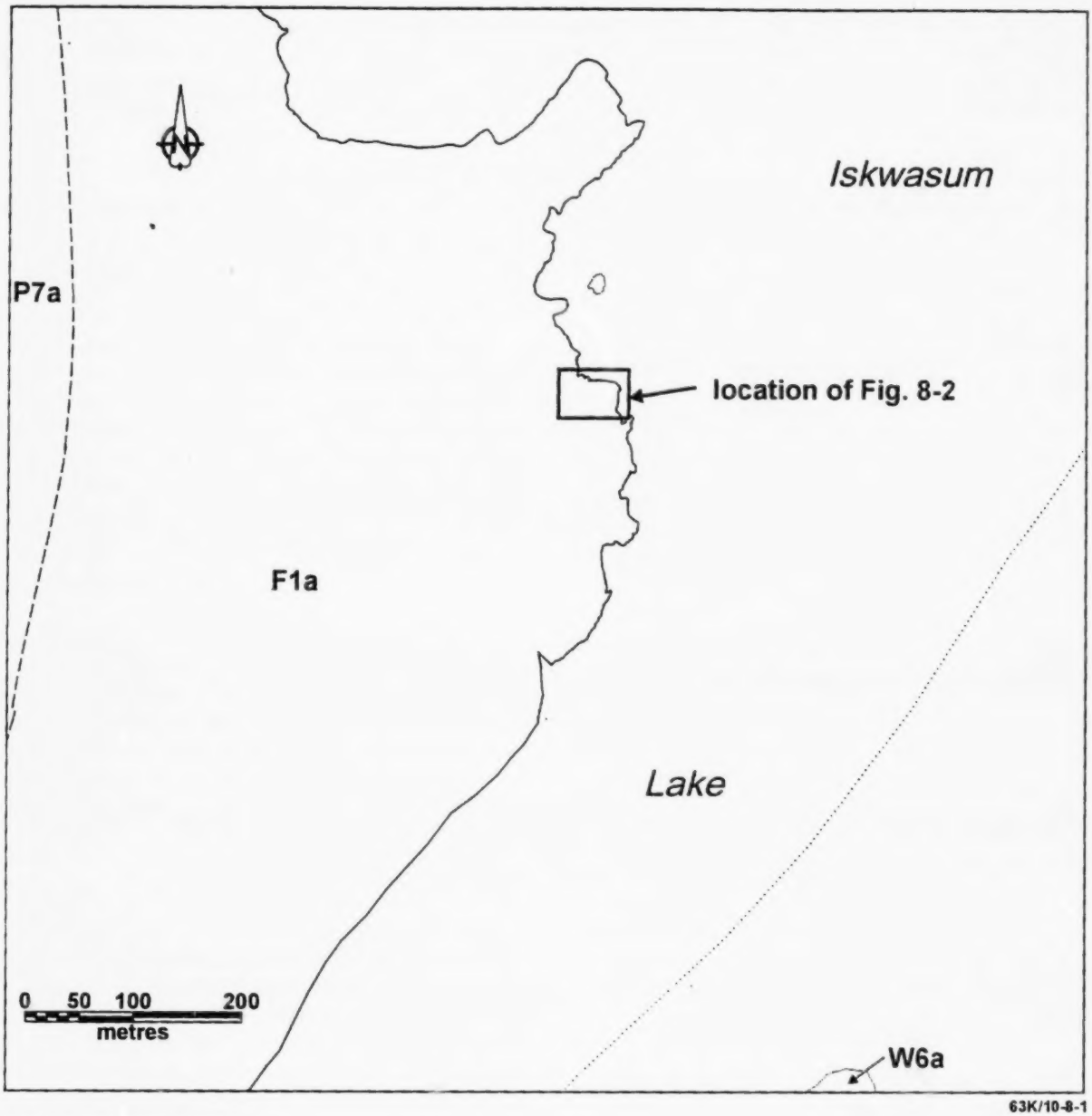
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

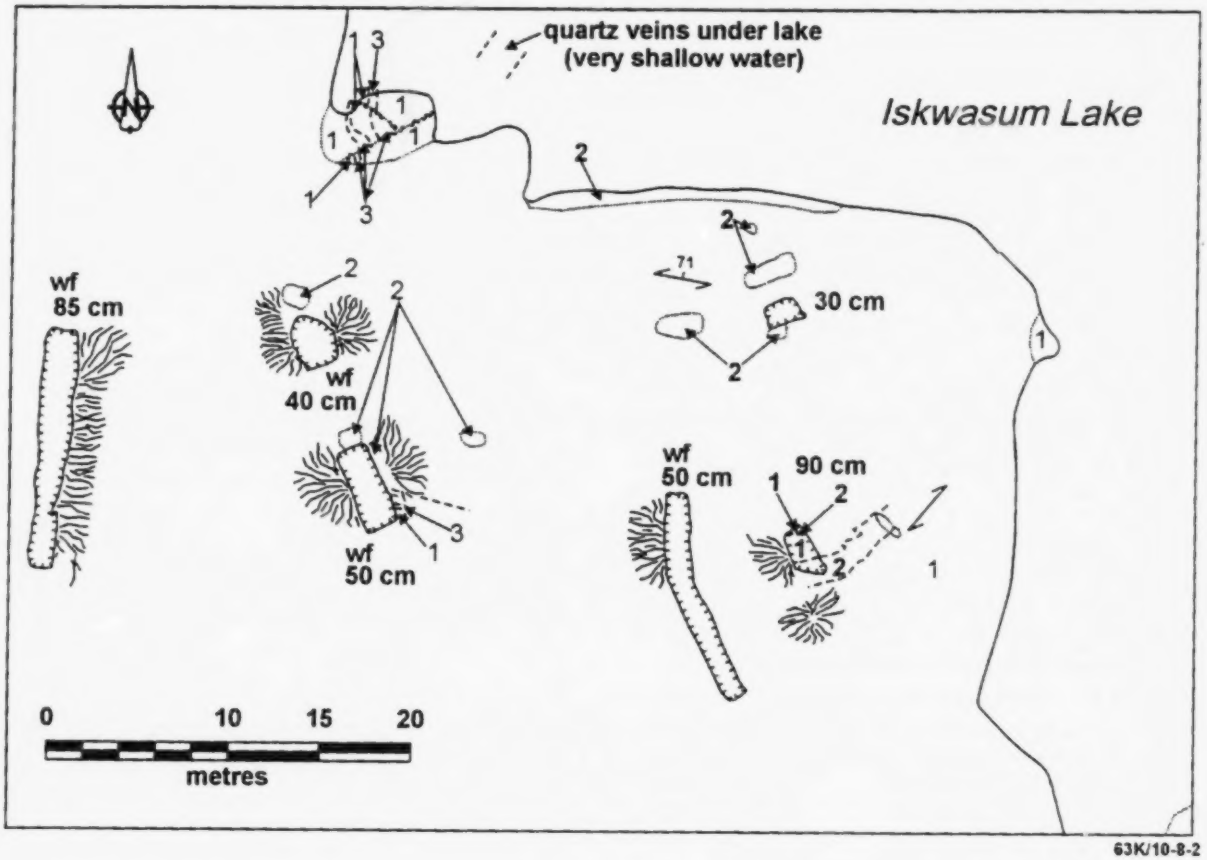


PALEOPROTEROZOIC

W6a	Mafic tectonite, phyllonite, mylonite
P7a	Granodiorite
F1a	McDougalls Point pillowed and massive basalt, diabase?

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Figure 8-1: Geological setting of Occurrence 8.



3 Feldspar porphyry

2 Massive white quartz

1 Mafic tectonite:
very schistose, crennulated, calcareous

Geologic contact (approximate)

Fault

65 Schistosity (inclined; dip unknown)

Outcrop

50 cm Trench with associated spoil pile and maximum depth

wf water-filled

Figure 8-2: Geology and trench locations of Occurrence 8.

LOCATION: 9

NAME:
UTM: 386570 E, 6051965 N
AREA: south shore of Loucks Lake
ACCESS: via boat on the Grass River and Loucks Lake
AIRPHOTO: A26325-95

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970, Map 65-3) indicated a gossan at this location. The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). Although not specifically reported in assessment files, conductor axes of a ground EM (HLEM) survey performed over Loucks Lake prior to May 1985 are indicated in A.F. 92819.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 9-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The rocks underlying Loucks Lake consist of mafic tectonites, phyllonites and mylonites (unit W6a) and felsic tectonites (unit P11a) derived from felsic granitoid rocks of the Gants Lake batholith, and comprise the Loucks Lake shear zone (Syme, 1994). Feldspar porphyritic granodiorite (unit P7b) of the Gants Lake batholith outcrops a short distance to the SE. The regional Berry Creek fault (Syme, 1994) occurs to the south of the occurrence.

The host rocks at the occurrence consist of fine grained, laminated lithologies that trend 035° to 070°, dip steeply to the southeast, and show open folds. Some of the layers are calcareous as indicated by weathered pits. A 20 cm thick boudinaged granodioritic sill cuts the laminated sequence.

MINERALIZATION

Two rusty weathered layers are present at the occurrence. The northern layer parallels the shoreline for about 10 m and forms a deeply weathered recessive band approximately 30 cm thick, conformable with the foliation. No sulphides were noted. Small scale (several cm) sinistral offsets displace the bands at periodic intervals. The rusty rock is more granulose than the surrounding fine grained siliceous bands.

The southern rusty band is approximately 15 cm thick and occurs approximately 5 m south of the one described previously. It is also a recessive conformable layer and fresh samples containing sulphides could not be collected.

Several quartz veins, up to 10 cm thick, cut the rusty bands at a shallow angle. The quartz is milky and contains black chlorite masses. It tends to be stained by iron oxides, but no pyrite was observed.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Disseminated mineralization; not classified. Within strongly deformed mylonitic sequence.

REFERENCES

A.F. 91708, 91854, 92472 and 92819; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

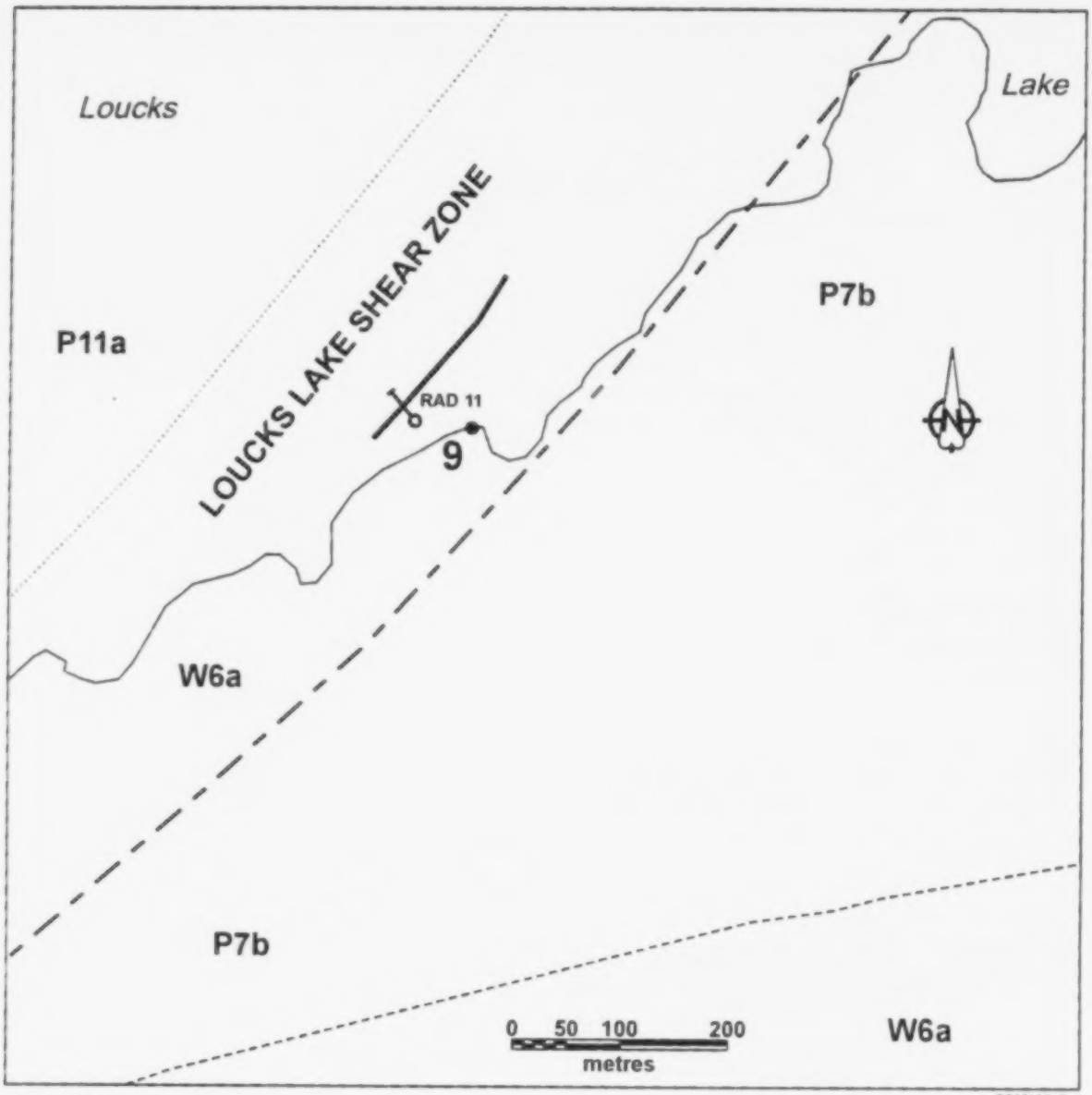
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P11a — Felsic tectonite, mylonite
- P7b — Granodiorite to tonalite
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Working Project Group, 1998
- Shear Zone boundary (approximate)
- EM conductor (A.F. 92819)
- Drillhole (A.F. 92819)
- 9 — Mineral occurrence location

Figure 9-1: Geological setting of Occurrence 9.

LOCATION: 10

NAME: Barb Lake #1
UTM: 383050 E., 6062260 N.
AREA: island in Barb Lake
ACCESS: via boat on Iskwasum Lake, traverse along portage to Barb Lake then via boat.
AIRPHOTO: A26326-96

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279) and delineated a conductor that may be a response to Hunt's (1970) mineral occurrence. Two holes were drilled in 1965 (A.F. 90280) NE and south of the occurrence. Hunt (1970, Map 65-3) indicated a mineral prospect at this location. Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). An EM (Turam) survey was performed and a number of the conductive responses were drilled by Hudson Bay Exploration and Development Company, Limited in 1970-71 (A.F. 90278). Hunt (1970) indicated a mineral prospect along the northwest shore of an island in the eastern part of Barb Lake, but no description was provided for this occurrence. Following VLF-EM and HLEM surveys (A.F. 92848), Granges Exploration Ltd. drilled 6 holes in the area in 1988 (A.F. 92849). The Granges project did not investigate the immediate occurrence area.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 10-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by the Claw Bay basalt (unit F1b). Granodiorite (unit P7a) and tonalite (unit P6a) of the Iskwasum Lake stock intrude the sequence a few kilometres to the southwest. Gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum Lake mafic-ultramafic complex occur to the east of the occurrence (Syme, 1994). The rock sequence at the occurrence trends towards the NNE with a moderate to steep ESE dip. Electromagnetic conductors trend parallel to the regional foliation in the area.

MINERALIZATION

DDH #1 intersected an 11.5 ft. (3.5 m) interval containing 70% to solid pyrrhotite associated with minor quartz (A.F. 90280). The occurrence was not examined in the field and Hunt (1970) does not provide a description of the mineralization.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 90278, 90279, 90280, 90281, 91854, 92848 and 92849; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

PALEOPROTEROZOIC

F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

F6b — Pyroxenite, peridotite, serpentinite

F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite

..... Geological contact (extrapolated) - NATMAP Shield Margin Working Group Project, 1998

— – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

——— EM conductor (A.F. 90279)

⊢○ Drillhole (A.F. 90280)

● 10 Mineral occurrence location

Figure 10-1: Geological setting of Barb Lake #1 occurrence.

LOCATION: 11

NAME: Barb Lake #2
UTM: 383550 E., 6062380 N.
AREA: island in Barb Lake
ACCESS: via boat on Iskwasum Lake, traverse along portage to Barb Lake then via boat.
AIRPHOTO: A26326-77

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279) and drilled two holes in 1965 (A.F. 90280) west and south of the occurrence. Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). An EM (Turam) survey was performed and a number of the conductive responses were drilled by Hudson Bay Exploration and Development Company, Limited in 1970-71 (A.F. 90278). Hunt (1970) indicated a mineral prospect on an island in the eastern part of Barb Lake, but no description was provided for it. Following VLF-EM and HLEM surveys (A.F. 92848), Granges Exploration Ltd. drilled 6 holes in 1988 to test several of the electromagnetic conductors (A.F. 92849). The immediate occurrence area was not examined.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 11-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) and pyroxenite, peridotite and serpentinite (unit F6b) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). Granodiorite (unit P7a) and tonalite (unit P6a) of the Iskwasum Lake stock intrude the sequence a few kilometres to the southwest. The rock sequence in the area trends NNE with a moderate to steep ESE dip. Electromagnetic conductors trend parallel to the regional foliation in the area.

MINERALIZATION

The occurrence was not examined in the field and Hunt (1970) does not provide a description of the mineralization.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 90278, 90279, 90280, 90281, 91854, 92848 and 92849; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

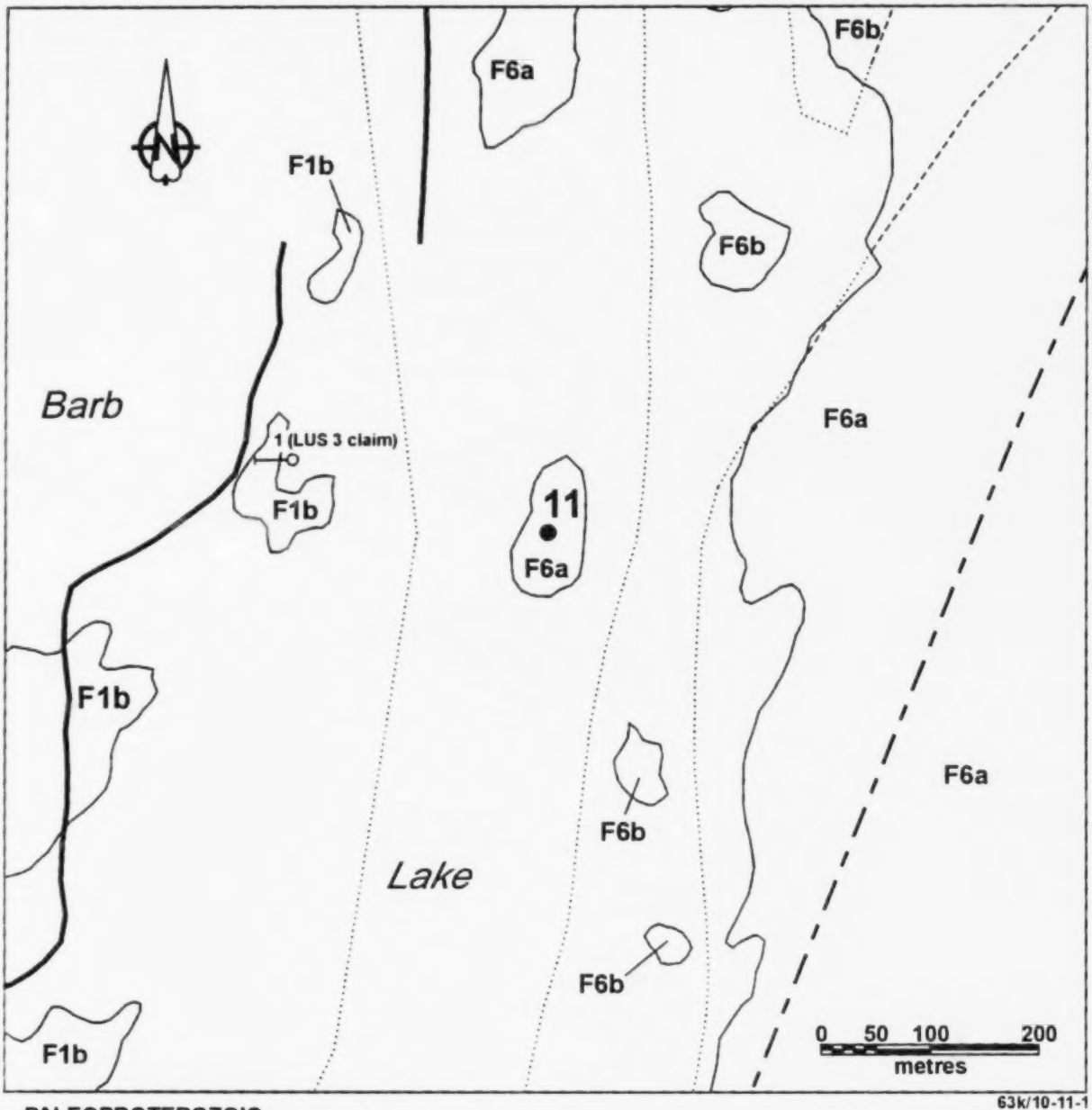
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

F6a Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

F6b Pyroxenite, peridotite, serpentinite

F1b Claw Bay pillowed and massive basalt, diabase, derived tectonite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90279)

Drillhole (A.F. 90280)

11 Mineral occurrence location

Figure 11-1: Geological setting of Barb Lake #2 occurrence.

LOCATION: 12

NAME: mineralization intersected by diamond drilling
UTM: 373525 E, 6060845 N
AREA: approximately 3300 m NW of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake and along Grass River, then traverse
AIRPHOTO: A26237-190

EXPLORATION SUMMARY

In 1949 six holes were drilled east of Campbell Lake (unofficial name) to test a north-striking fault zone that has associated gold mineralization (A.F. 90284; Mineral Inventory File 734). Additional drilling was performed on the property about 1951 and an electromagnetic survey was undertaken in 1958 (Mineral Inventory File 734). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

The location of these drill holes relative to "Campbell Lake" could not be determined accurately, and the location of this occurrence is only approximate.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 12-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by the McDougalls Point basalt (unit F1a) and associated rocks (Syme, 1994).

The drillhole lithological descriptions suggest that much of the sequence at the occurrence consists of mafic volcanic rocks, feldspar porphyry and schistose equivalents (A.F. 90284). Rocks are only poorly exposed and no detailed geological investigations have been undertaken in the area.

MINERALIZATION

Schistose rocks containing quartz and pyrite with traces of chalcopyrite and carbonate were intersected in drillhole RG-2 (A.F. 90284).

GEOCHEMICAL DATA

Hole RG-2 intersected a 1.2 ft. (0.37 m) interval that assayed 0.28 oz. Au/ton (9.6 g Au/t). A second 2.0 ft. (0.61 m) interval in the same hole assayed 0.18 oz. Au/ton (5.72 g Au/t) (A.F. 90284).

CLASSIFICATION

Vein type deposit; single vein. Possible fault hosted single or series of quartz veins.

REFERENCES

A.F. 90284, 91564 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Mineral Inventory File No. 734

Manitoba Energy and Mines, Geologic Services

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

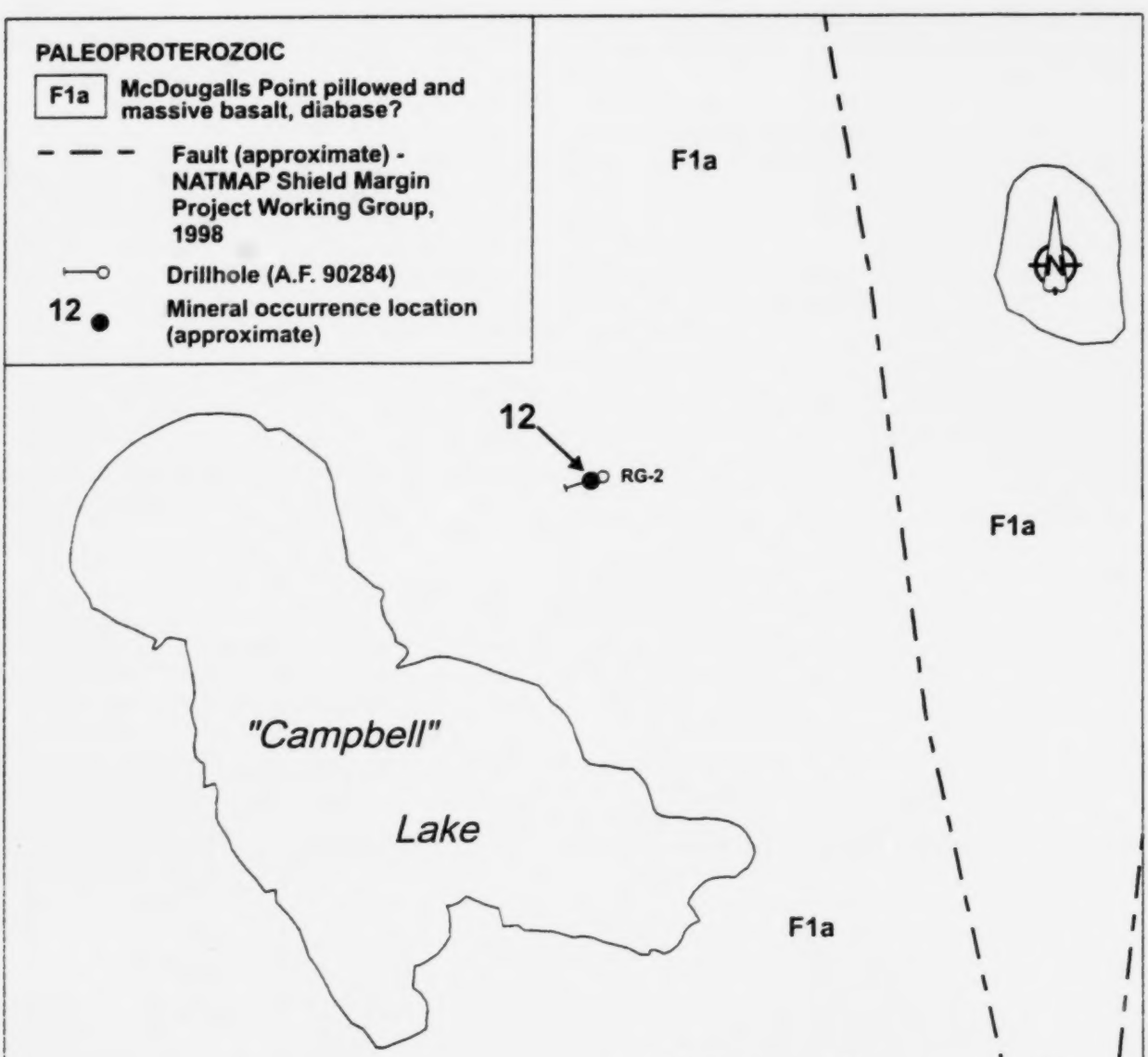


Figure 12-1: Geological setting of Occurrence 12.

LOCATION: 13

NAME: Fourmile Island occurrences
UTM: Site 1. 400510 E, 6054535 N
Site 2. 400250 E, 6054310 N
Site 3. 401485 E, 6053890 N
Site 4. 402180 E, 6053680 N
Site 5. 402675 E, 6053510 N
AREA: on Fourmile Island, Reed Lake
ACCESS: via boat from Reed Lake provincial campground, then traverse
AIRPHOTO: A26325-24

EXPLORATION SUMMARY

The first claims were staked on Fourmile Island in 1928 by C. Taylor. Some surface work was completed in 1929. In 1933 J.R. Eagle staked the Treasure Island claim and approximately 30 trenches were excavated. In 1937 Fourmile Island was assigned to J. Waldron, a director of Reed Lake Mines Ltd. A shaft was sunk to at least 21 ft. (6.4 m) and "good" assays were obtained. By 1939 the shaft had flooded. In 1947 Middleground Mining Company Ltd. drilled 10 holes totalling approximately 2051 ft. (625 m) (Mineral Inventory File 735). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Hudson Bay Exploration and Development Company, Limited performed EM and radiometric surveys over the area in 1967-68 (A.F. 91661). From 1970 to 1974 Hudson Bay Exploration Company Ltd. performed electromagnetic and Turam surveys over the property and some diamond drilling was undertaken (Mineral Inventory File 735). In 1983 and 1985 several holes were drilled in the area by Hudson Bay Exploration and Development Company Ltd. A down-hole pulse EM survey was performed in 1985 (Mineral Inventory File 735).

The trenches at the occurrences are generally completely overgrown, water-filled and/or caved, and bedrock is poorly exposed.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 13-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).Various geological investigations have been undertaken in the Fourmile Island area by several workers including Harrison (1949), Rousell (1970), Bailes (1971), Stewart (1977), Syme *et al.* (1995) and the NATMAP Shield Margin Project Working Group (1998). Most of the island is underlain by a juvenile arc granodiorite-tonalite intrusion (unit J12). Parts of the intrusion show a penetrative foliation, and east-trending mylonitic zones and quartz-filled tension fractures are fairly common.

MINERALIZATION

White quartz occurring as masses and veins that cut the granodiorite-tonalite intrusion have been evaluated in trenches at several places on Fourmile Island (Fig. 13-2, 13-3, 13-4, 13-5 and 13-6). The veins range in strike from NNW to NE, and occupy tension fractures. They range from stringer networks to discrete quartz veins up to 2 m thick. Only one major *in situ* vein was noted during the examination of the trenches. This irregular vein is the southern extension of the one exploited in the eastern trenches at Site 3 (Fig. 13-4). A fairly large proportion of the muck adjacent to the other trenches at other sites of this occurrence consist of milky quartz vein material. The veins contain up to 10% Fe-carbonate (ankerite?), but only small quantities of disseminated pyrite were noted. The intrusion also shows patchy chloritization and possible sericitization associated with strongly carbonatized areas.

No gold values have been reported for these occurrences, but Corky Peterson (pers. comm., 1993) indicated that he and his father were able to "make wages" by hand working the quartz vein in the eastern trenches at Site 3.

GEOCHEMICAL DATA

None

CLASSIFICATION

Vein type deposit; multiple veins or lenses.

REFERENCES

A.F. 91661; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1971: Preliminary Compilation of the Geology of the Snow Lake-Flin Flon-Sherridon Area; Department of Mines and Natural Resources, Mines Branch, Geological Paper 1/71, 27 p.

Harrison, J.M.

1949: Geology and Mineral Deposits of File-Tramping Lakes Area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Mineral Inventory File No. 735

Manitoba Energy and Mines, Geologic Services

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Rousell, D.H.

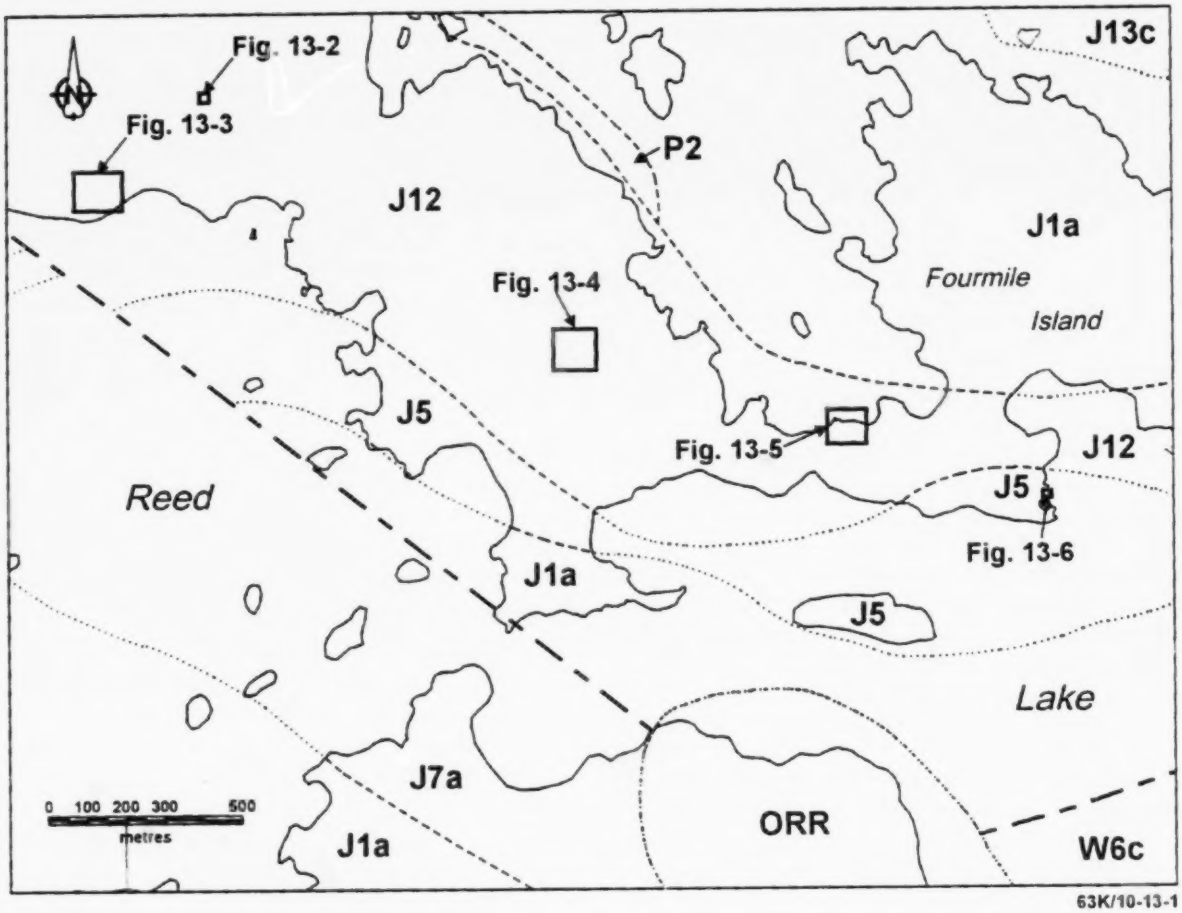
1970: Geology of the Iskwasum Lake Area (East Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 66-3, 26 p.

Stewart, J.W.

1977: Gold evaluation program; in Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division, Report of Field Activities, 1977, p. 105-108.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Minerals Division, Report of Activities, 1995, p. 42-60.



PALEOZOIC

ORR — Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6c — Mafic phyllonite ± carbonate, cataclasite

P2 — Gabbro, diorite, quartz diorite and derived amphibolite

J13c — Rhyolite, dacite; quartz porphyry, feldspar porphyry, quartz-feldspar porphyry

J12 — Tonalite to granodiorite, granite

J7a — Felsic tuff, lapilli tuff, breccia heterolithologic breccia

J5 — Mafic volcaniclastic rocks

J1a — Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Working Group, 1998

Phanerozoic boundary - NATMAP Shield Margin Working Group, 1998

Figure 13-1: Geology setting of Fourmile Island gold occurences.

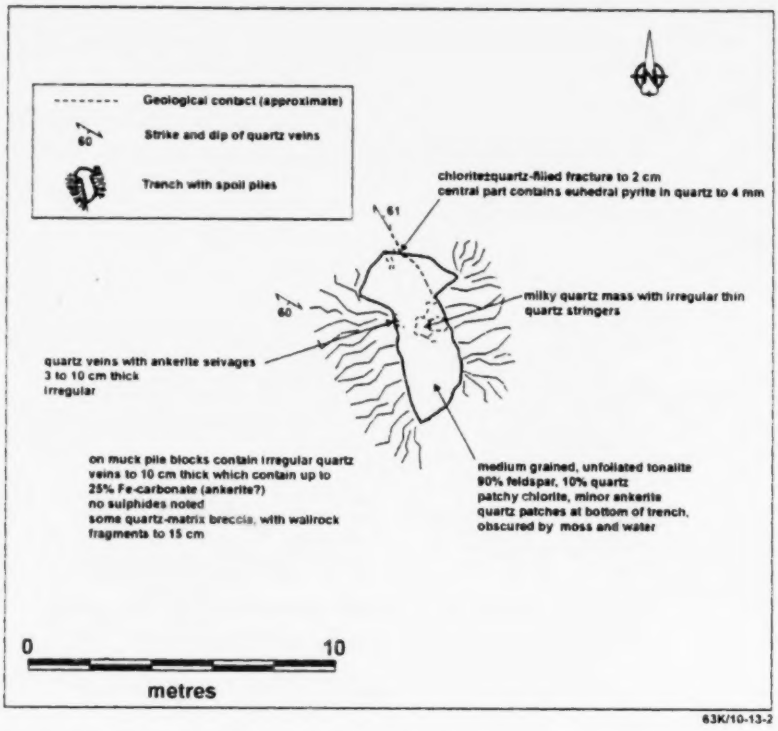


Figure 13-2: Geology of trench at Site 1, Occurrence 13 (Fourmile Island).

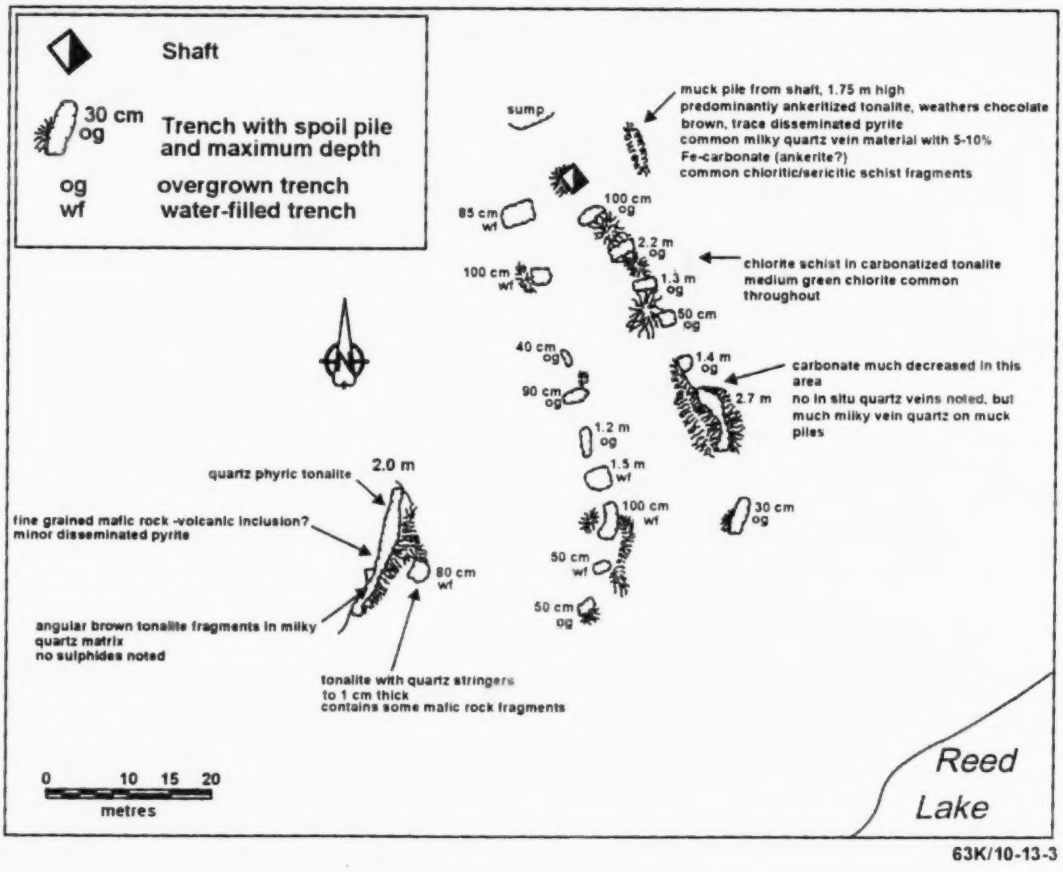


Figure 13-3: Geology and trench locations at Site 2, Occurrence 13 (Fourmile Island).

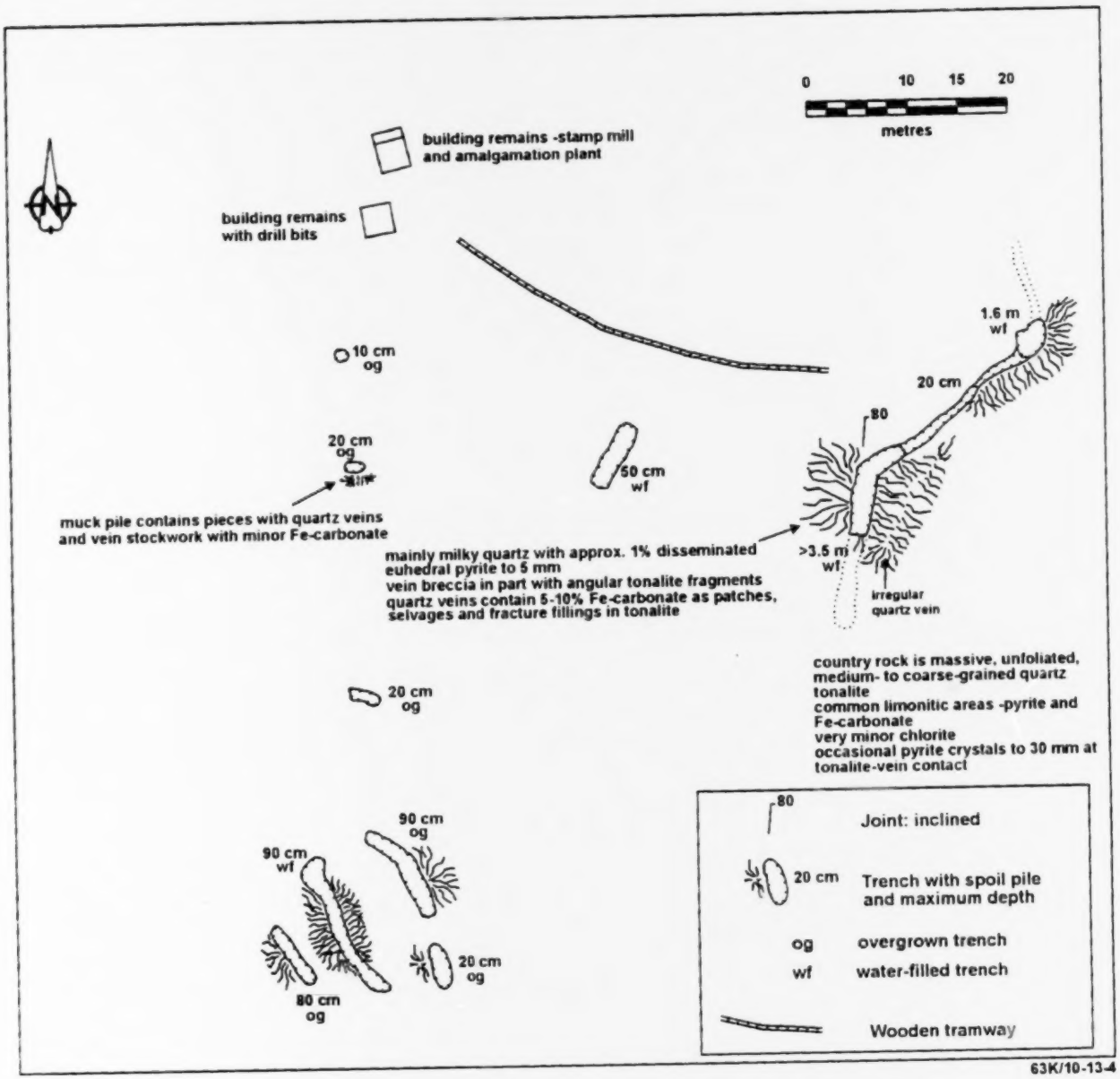

0 10 15 20
metres
building remains -stamp mill and amalgamation plant
building remains with drill bits
10 cm og
20 cm og
50 cm wf
1.6 m wf
20 cm
80
muck pile contains pieces with quartz veins and vein stockwork with minor Fe-carbonate
mainly milky quartz with approx. 1% disseminated euhedral pyrite to 5 mm
vein breccia in part with angular tonalite fragments
quartz veins contain 5-10% Fe-carbonate as patches, selvages and fracture fillings in tonalite
>3.5 m wf
irregular quartz vein
country rock is massive, unfoliated, medium- to coarse-grained quartz tonalite
common limonitic areas -pyrite and Fe-carbonate
very minor chlorite
occasional pyrite crystals to 30 mm at tonalite-vein contact
20 cm og
90 cm og
90 cm wf
20 cm og
80 cm og
80 Joint: inclined
20 cm Trench with spoil pile and maximum depth
og overgrown trench
wf water-filled trench
Wooden tramway
63K/10-13-4

Figure 13-4: Geology and trench locations at Site 3, Occurrence 13 (Fourmile Island).

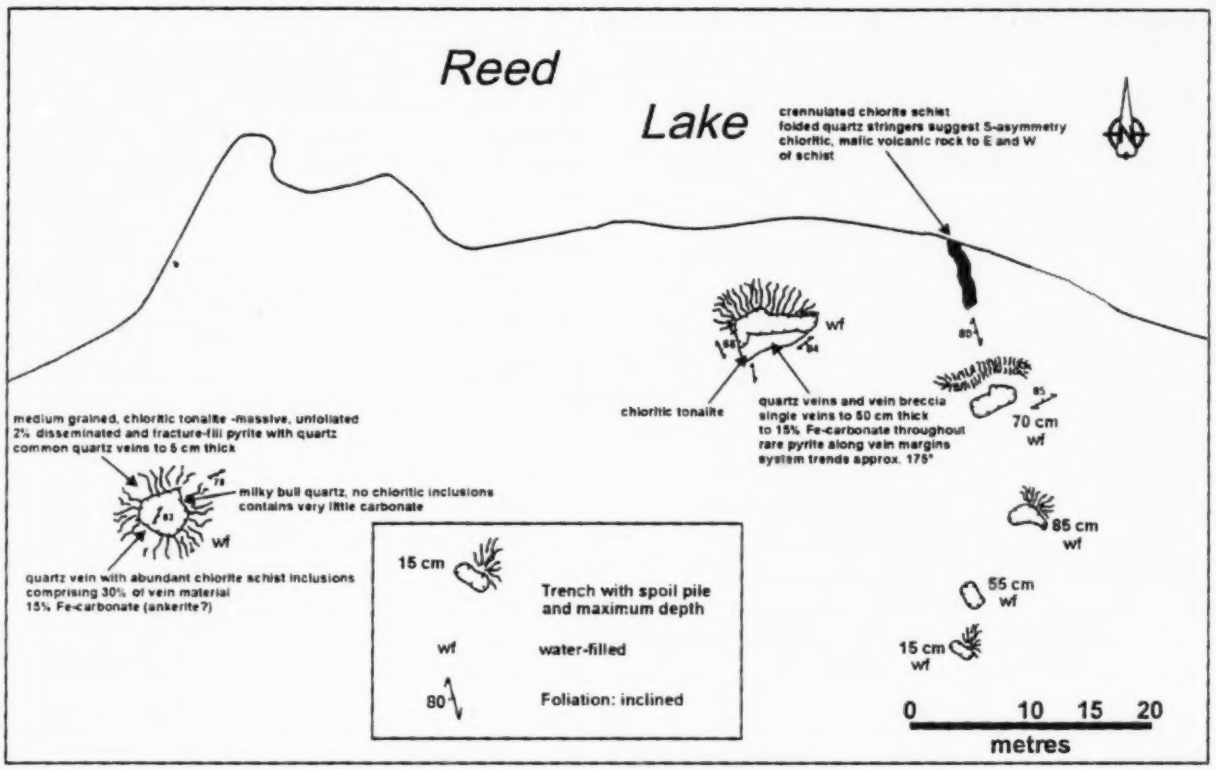


Figure 13-5: Geology and trench locations at Site 4, Occurrence 13 (Fourmile Island).

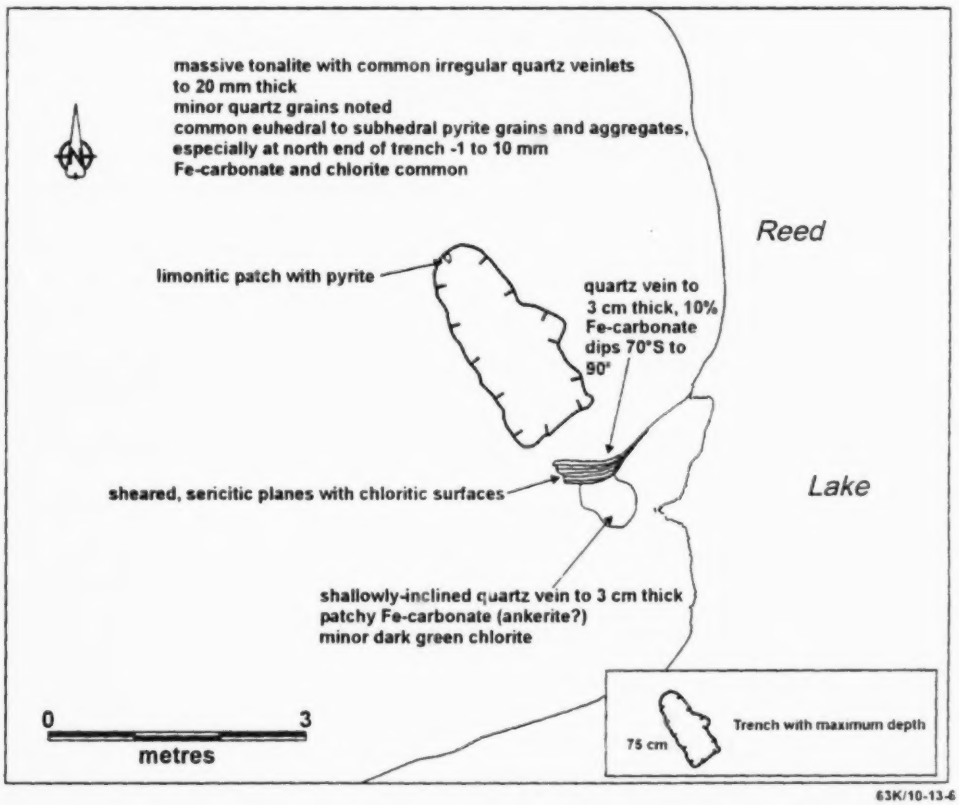


Figure 13-6: Geology and trench location at Site 5, Occurrence 13 (Fourmile Island).

LOCATION: 14

NAME: Fourmile Island Copper (Reed Lake Copper)
UTM: 400900 E, 6055400 N (approximate)
AREA: north of the central part of Fourmile Island, Reed Lake
ACCESS: via boat from Reed Lake provincial campground
AIRPHOTO: A26325-23

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the Reed Lake-File Lake area (Mineral Inventory File No. 736). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). EM and Turam surveys were performed by Hudson Bay Exploration and Development Company, Limited in 1970 and 1971, accompanied by diamond drilling programs from 1970 to 1980, 1983 and 1985. Additional ground geophysical surveys were performed in 1988 and 1989 (Mineral Inventory File No. 736).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 14-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The rocks in the deposit area consist of tholeiitic basalt, basaltic andesite, gabbro and derived amphibolite (unit J1a). Compositionally layered gabbro sills and intrusions (units P3a, P3b and P3c) that may belong to the Josland Lake gabbro (Bailes, 1980; Syme *et al.*, 1995a, b) occur to the NW. The deposit is not exposed at surface, and all assessment files remain confidential.

MINERALIZATION

All assessment files for the deposit remain confidential.

GEOCHEMICAL DATA

The 1973 Annual Report of Hudson Bay Mining and Smelting Company indicated that the deposit contains 1 361 000 tonnes at an average grade of 2.09% Cu down to 550 m with a 10% dilution factor. Esposito (1986) reported 1 035 794 tonnes at a grade of 2.18% Cu. The deposit also contains zinc.

CLASSIFICATION

Stratabound massive sulphide type deposit; volcanic rock associated (?)

REFERENCES

A.F. 91661; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services

Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

Esposito, B.

1986: Copper and Zinc in Manitoba; Manitoba Energy and Mines, Mineral Education Series, p. 23.

Mineral Inventory File No. 736; Manitoba Energy and Mines, Geologic Services

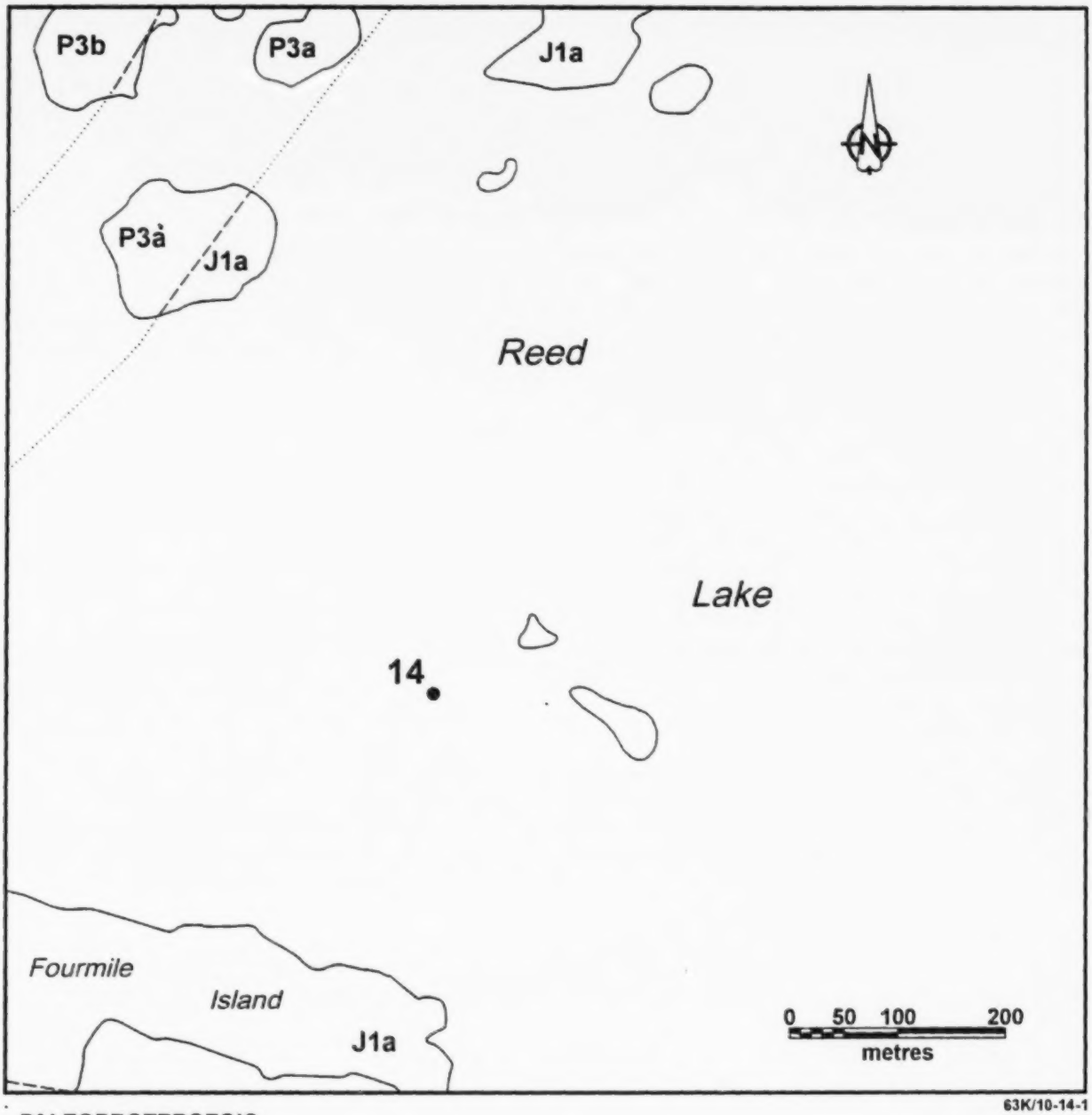
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, 1:50 000 scale.



PALEOPROTEROZOIC

P3a	Gabbronorite, gabbro
P3b	Ferrogabbro
J1a	Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

--------- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Working Project, 1998

14 ● Mineral occurrence location

Figure 14-1: Geological setting of Fourmile Island Copper (Reed Lake Copper) deposit.

LOCATION: 15

NAME: GAR 11
UTM: 387315 E, 6054995 N
AREA: under Loucks Lake
ACCESS: via boat along the Grass River to Loucks Lake
AIRPHOTO: A26325-97

EXPLORATION SUMMARY

In 1957 an EM survey was carried out by the Parrex Mining Syndicate (Trust). Several conductors were outlined and at least six holes were drilled to test the geophysical responses, three of which were submitted for assessment purposes (A.F. 90270). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 15-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by felsic tectonite and mylonite (unit P11a) and mafic tectonite, phyllonite and mylonite (unit W6a) that comprise the Loucks Lake shear zone (Syme, 1994). These mylonites (unit P11a) are derived mainly from felsic granitoid rocks of the Gants Lake batholith. Granodiorite (unit P7a) occurs to the east.

The drill program intersected a variety of schistose mafic lithologies (A.F. 90270). The descriptions in the lithologs indicate that the sequence is composed mainly of banded rocks, similar to the mylonites described by Syme (1994).

MINERALIZATION

Minor sulphide mineralization was intersected in holes 1 and 2. Hole 1 intersected up to 10% pyrrhotite with traces of chalcopyrite over 0.6 m. In hole 2 one 6 foot (1.8 m) interval contains up to 7% unspecified sulphides. A second 1 foot (0.3 m) interval is garnetiferous and contains up to 5% pyrite (A.F. 90270).

GEOCHEMICAL DATA

Anomalous gold and silver assay values were returned from the first mineralized interval in hole 2. Assays of 0.01 oz. Au/ton over 9 ft. (0.3 g Au/t over approximately 2.7 m) and 0.16 oz. Ag/ton over 13 ft. (5.5 gm Ag/t over approximately 4 m) were obtained (A.F. 90270).

CLASSIFICATION

Disseminated mineralization - not classified. Strongly sheared, hosted by mylonitic sequence.

REFERENCES

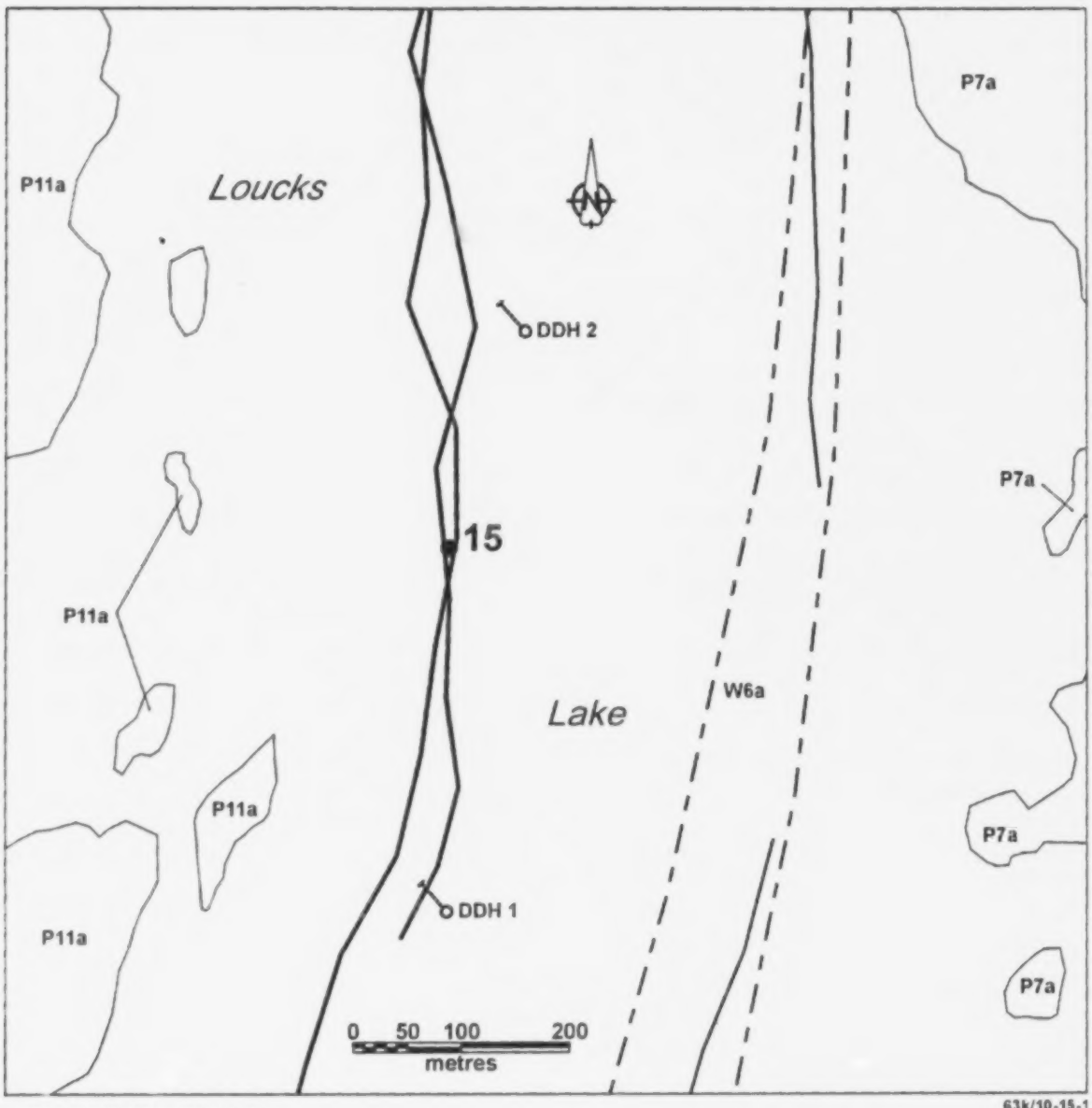
A.F. 90270 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

W6a Mafic tectonite, phyllonite, mylonite

P11a Felsic tectonite, mylonite

P7a Granodiorite

— – Shear Zone boundary (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90270)

Drillhole (A.F. 90270)

15 ● Mineral occurrence location

Figure 15-1: Geological setting of GAR 11 occurrence.

LOCATION: 16

NAME: Rail Lake
UTM: 397850 E, 6067300 N (approximate)
AREA: north of abandoned CNR rail line from Snow Lake near junction with Dickstone mine road
ACCESS: by vehicle from Snow Lake along abandoned CNR rail line right-of-way
AIRPHOTO: MB90026-18

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). A geophysical survey was undertaken in 1957 followed by approximately 1160 m of diamond drilling in 1958 (Mineral Inventory File Number 737).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 16-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite containing variably mylonitized felsic sheets (unit W6b), that define the West Reed-North Star shear zone (Syme *et al.*, 1995a, b). Granodiorite (unit P7a) of the Little Swan Lake pluton occurs to the west of the deposit.

Assessment files describing the host rocks for the deposit remain confidential.

MINERALIZATION

No mineralization is exposed at surface, and assessment files describing the mineralization remain confidential.

GEOCHEMICAL DATA

Walford and Franklin (1982) reported 453 000 tones grading 2.85% Cu and 0.7% Zn. Esposito (1986) indicated a reserve of 294 000 tonnes of 3.0% Cu and 0.7% Zn.

CLASSIFICATION

Stratabound massive sulphide type deposit; volcanic rock associated

REFERENCES

A.F. 91619; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Esposito, B.

1986: Copper and Zinc in Manitoba; Manitoba Energy and Mines, Mineral Education Series, 23 p.

Mineral Inventory File No. 737

Manitoba Energy and Mines, Geologic Services

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

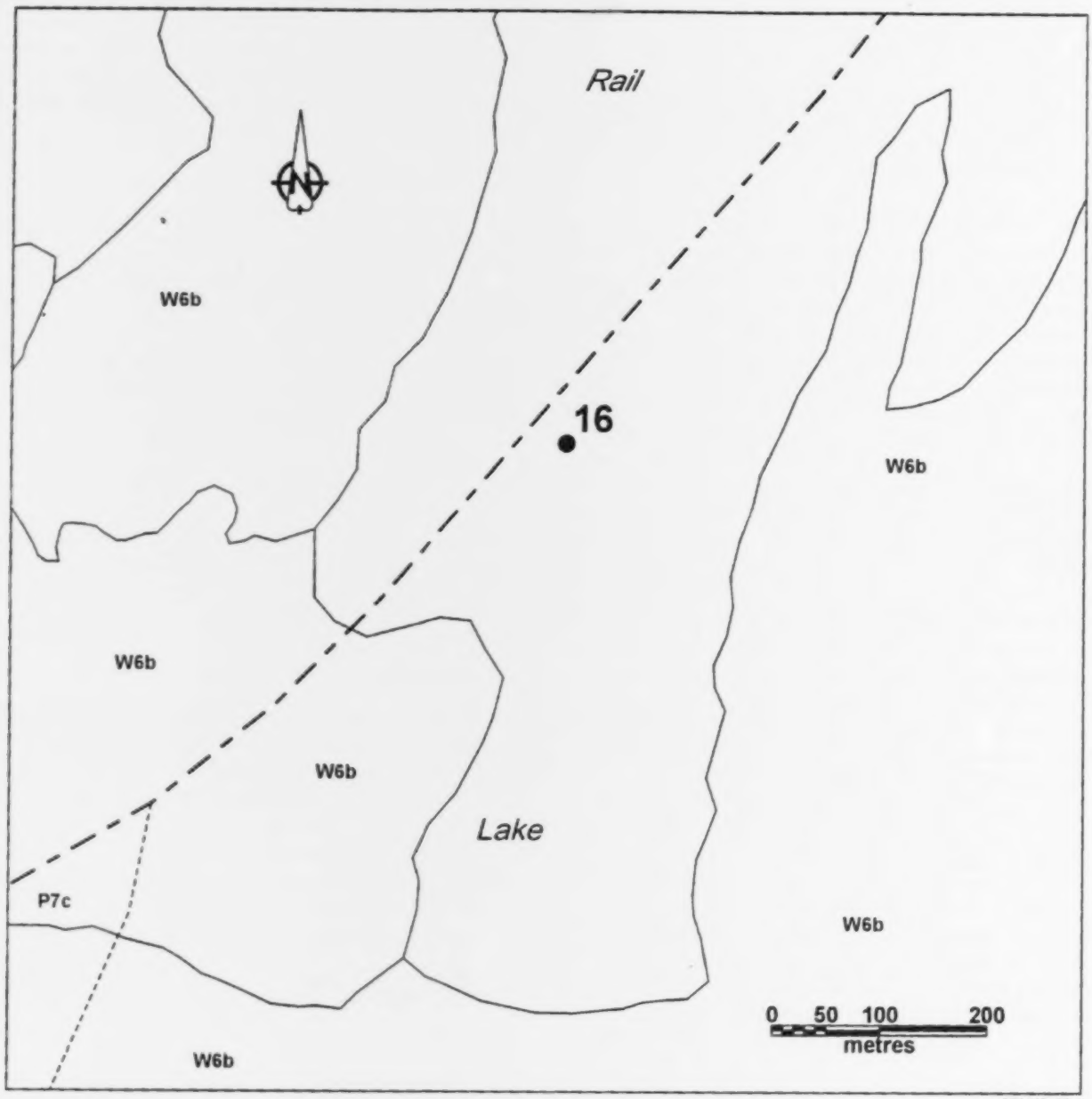
Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, 1:50 000 scale.

Walford, P.C. and Franklin, J.M.

1982: The Anderson Lake mine, Snow Lake, Manitoba; in Precambrian Sulphide Deposits, R.W. Hutchinson, C.D. Spence and J.M. Franklin, editors, Geological Association of Canada Special Paper 25, 484 p.



PALEOPROTEROZOIC

- **W6b** — Mafic tectonite with mafic-felsic intrusive sheets
- **P7c** — Xenolith-rich granodiorite
- ------- Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998
- — – Fault (approximate) - NATMAP Shield Margin Working Project, 1998
- **16** ● Mineral occurrence location

Figure 16-1: Geological setting of Rail Lake deposit.

LOCATION: 17

NAME: CB 9461
UTM: 390620 E 6055920 N
AREA: north end of Flag Lake (Grass River)
ACCESS: via boat along the Grass River from Iskwasum provincial campground
AIRPHOTO: A26365-6

EXPLORATION SUMMARY

Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled (A.F. 90250). In 1972 Hudson Bay Exploration and Development Company, Limited performed EM (Turam) and magnetic surveys (A.F. 90263, 90264, 91818). In 1980 a regional airborne EM, radiometric and magnetic survey was performed by Canadian Nickel Company Limited (A.F. 92472). An Apex MaxMin II HLEM survey was performed for Hudson Bay Exploration and Development Company, Limited in 1982, who drilled several holes into the occurrence in 1983 (A.F. 92594, 92600).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 17-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic to felsic tectonite (unit P11a) of the Flag Lake shear zone. The mylonite was derived from the Gants Lake batholith. The Reed Lake mafic/ultramafic complex, a differentiated mafic intrusion (Williamson, 1992, 1993), occurs approximately 200 m east of the occurrence.

Drillholes EEL-306 and EEL-316 intersected a sequence of laminated rocks described as interlayered sandy to argillaceous, volcaniclastic metasedimentary rocks, mafic metavolcanic rocks and minor granitic intervals (A.F. 92594, 92600). Descriptions in the drillhole lithologs are consistent with rocks now known to be laminated tectonites.

MINERALIZATION

Hole EEL-306 intersected two intervals totalling 0.7 ft. (0.2 m) containing up to 3% chalcopyrite as stringers within garnetiferous chlorite schist. A second 0.4 ft. (0.1 m) interval contains 70% pyrrhotite, 20% pyrite and up to 1% chalcopyrite within a chloritic interval of "dacite tuff" (A.F. 92594). Hole EEL-316 intersected a 12.1 ft. (3.7 m) interval containing up to 30% pyrrhotite with lesser pyrite and minor sphalerite. Some of the sulphides occur as stringers in chloritic schist within a "dacite tuff" interval (A.F. 92600).

GEOCHEMICAL DATA

The following assays were obtained:

Interval	%Cu	%Zn
hole EEL-306		
62.4-62.9 ft. (19.0-19.2 m)	0.78	
98.0-98.5 ft. (29.9-30.0 m)	1.31	
100.5-101.1 ft. (30.6-30.8 m)	0.86	
160.0-160.5 ft. (48.8-48.9 m)	0.13	0.4
hole EEL-316		
360.0-360.1 ft. (109.7-109.8 m)	0.11	1.6
371.0-372.2 ft. (113.1-113.4 m)	0.27	2.5

CLASSIFICATION

Disseminated mineralization - not classified. Strongly sheared, hosted by mafic mylonitic sequence.

REFERENCES

A.F. 90250, 90263, 90264, 91818, 92472, 92594 and 92600; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

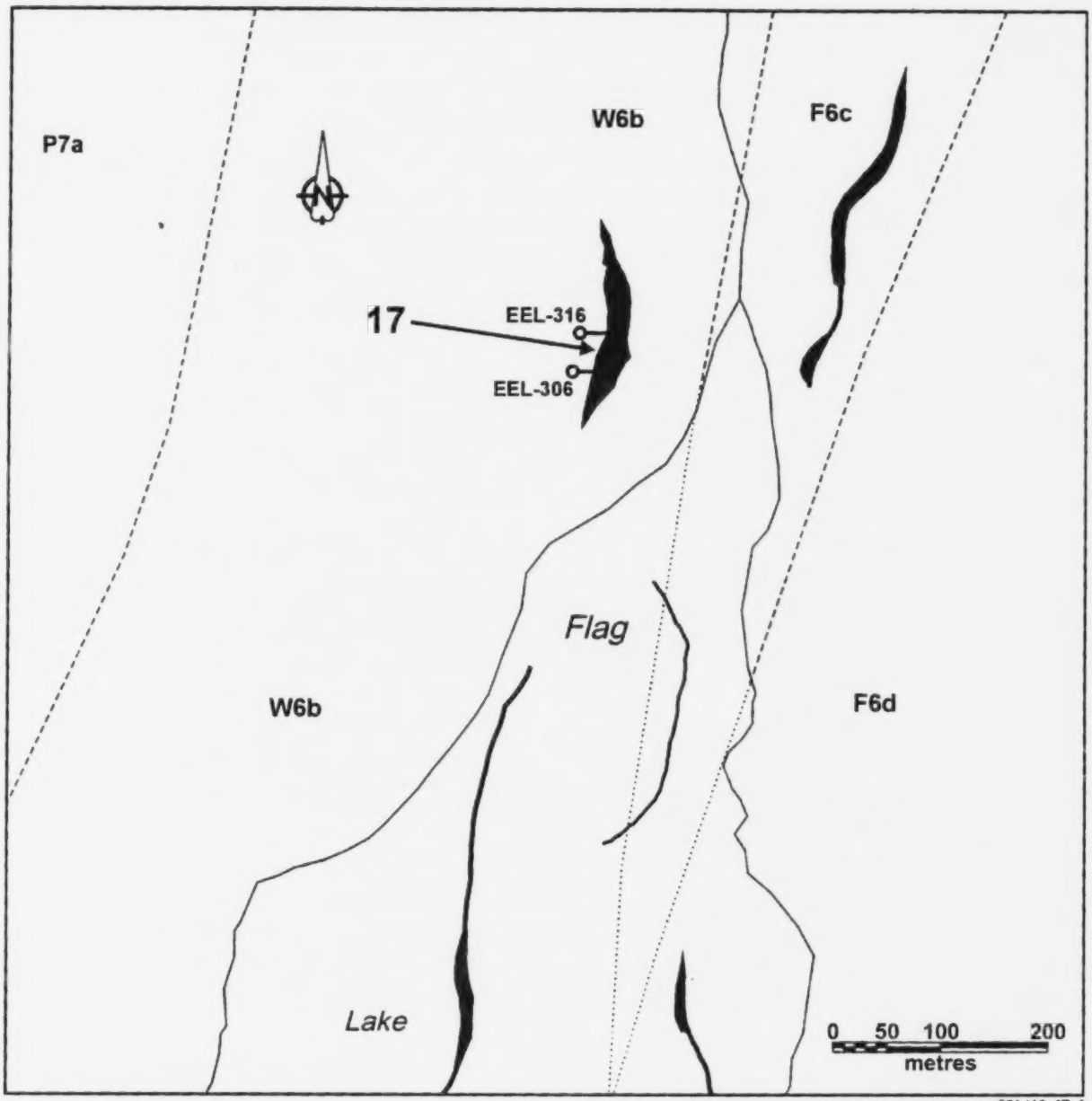
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Williamson, B.L.

1992: Reed Lake Gabbro project; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.



PALEOPROTEROZOIC

- W6b — Mafic tectonite with mafic-felsic intrusive sheets
- P7a — Granodiorite
- F6c — Layered gabbro, leucogabbro, anorthosite
- F6d — Layered pyroxenite, peridotite, subordinate gabbro

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 90263, 90264, 91818, 92594, 92600)
- Drillhole (A.F. 92594, 92600)
- 17 — Mineral occurrence location

Figure 17-1: Geological setting of CB 9461 occurrence.

LOCATION: 18

NAME: Krug Lake
UTM: 399205 E, 6063825 N
AREA: west side of Krug Lake northwest of Reed Lake
ACCESS: by 4-wheel drive vehicle along abandoned CNR rail bed from Chisel Lake then by boat on Krug Lake and traverse, or by bush plane and traverse.
AIRPHOTO: A26365-205

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey under Airborne Permit No. 10 (A.F. 91619). An HLEM survey was carried out over the area by Hudson Bay Exploration and Development Company, Limited in 1957 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352), who carried out an HLEM survey over the occurrence in 1975. The HLEM conductor was subsequently drilled (A.F. 92351).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 18-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Gabbro (unit P3a) belonging to the Josland Lake sill suite (Bailes, 1980) occurs approximately 800 m east of the occurrence, along the east side of Krug Lake. Tectonites/mylonites of the West Reed-North Star shear zone occur approximately 200 m west of the occurrence (Syme *et al.*, 1995a, b).

Hole KR-75-7 intersected an assemblage of variably fragmental felsic to mafic metamorphosed volcaniclastic and epiclastic rocks. Graphite is a common constituent over the interval 180.9 to 223.0 ft. (55.1 to 68 m), in places composing up to 80% of the rock (A.F. 92351).

MINERALIZATION

The graphitic interval contains common pyrite, in places composing 80% of the rock. Pyrrhotite and chalcopyrite are minor constituents.

GEOCHEMICAL DATA

The following assays were obtained from mineralized intervals in hole KR-75-7:

Interval	%Cu	%Zn	%Ni
207.7-209.4 ft. (63.3-63.8 m)	0.24	0.05	
217.0-219.0 ft. (66.1-66.8 m)	0.05	0.13	
219.0-220.2 ft. (66.8-67.1 m)	0.34	1.56	0.04
220.8-223.0 ft. (67.3-68.0 m)	0.08	0.17	0.03

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. Sulphides are hosted by metasedimentary rocks.

REFERENCES

A.F. 90250, 91619, 92351 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

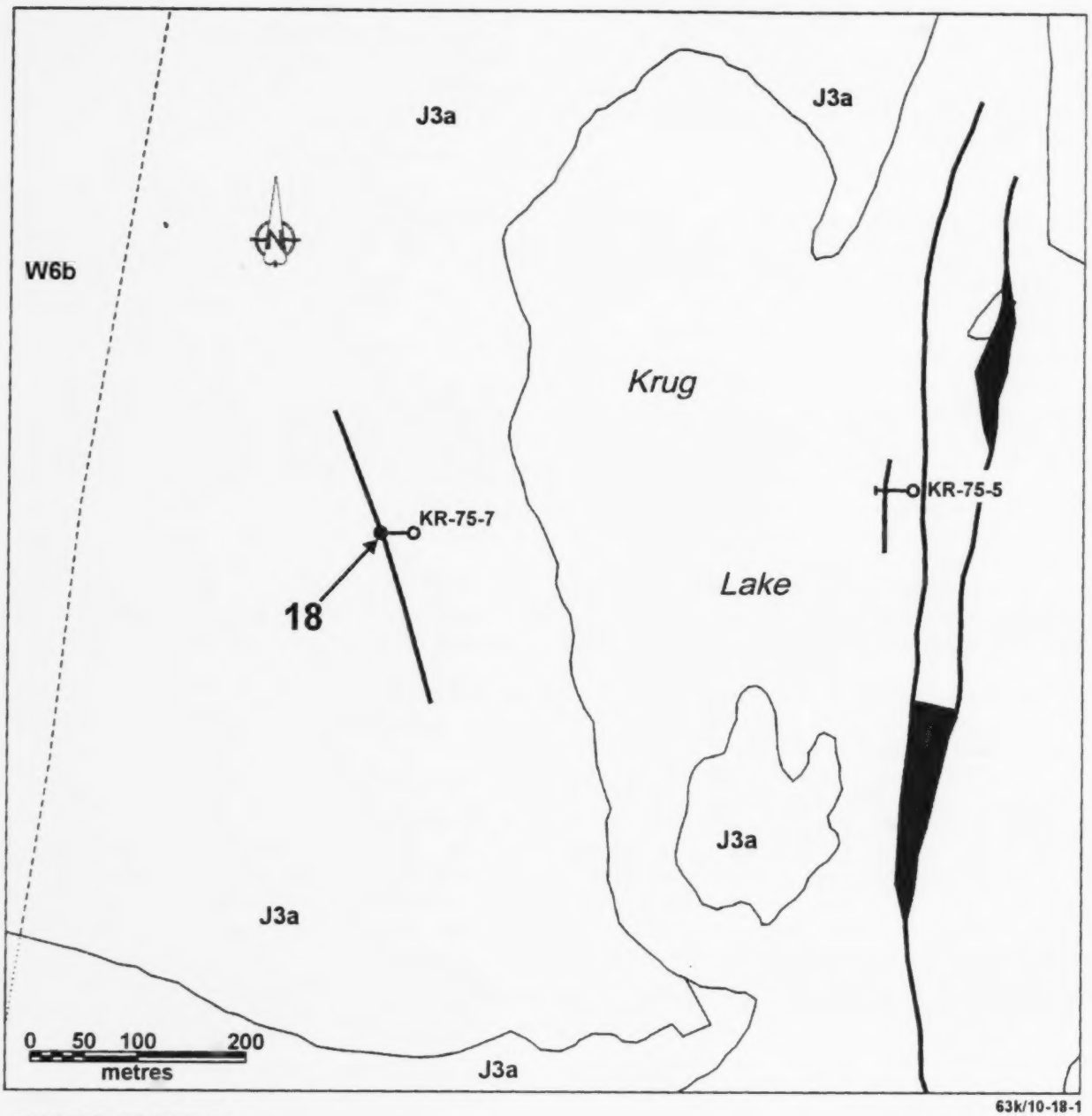
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, 1:50 000 scale.



PALEOPROTEROZOIC

W6b — Mafic tectonite with mafic-felsic intrusive sheets

J3a — Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 92351)

Drillhole (A.F. 92351)

18 Mineral occurrence location

Figure 18-1: Geological setting of Krug Lake occurrence.

LOCATION: 19

NAME: CB 2896
UTM: 399950 E 6060600 N
AREA: west of large island (unofficial name Kennedy Island) SSW of Petersons Bay, Reed Lake.
ACCESS: via boat on Reed Lake
AIRPHOTO: A26325-20

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited did an airborne EM and magnetic survey under Airborne Permit No. 10 (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1971 an HLEM (Turam) survey was performed for Straus Exploration Inc. (A.F. 92737) followed, in 1972, by an HLEM (EM-17) survey and drilling (A.F. 92735). Some of the other conductive responses defined by this survey were also subsequently drilled (A.F. 92736). In 1981 an airborne EM-30 survey was flown by Hudson Bay Exploration and Development Company, Limited and an HLEM (Apex MaxMin II) survey performed over the area (A.F. 92738). One hole was drilled as a result of this geophysical survey (A.F. 92738).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 19-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The geology of the area has been described by Syme *et al.*, 1995a, b). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Gabbroic rocks (unit P2) underlie most of Kennedy Island east of the occurrence. Gabbro (unit P3a) belonging to the Josland Lake sill suite (Bailes, 1980) occurs along the shoreline of Reed Lake west of the occurrence.

Drillholes into the occurrence intersected a sequence of foliated intermediate to felsic metavolcanic rocks and medium-grained quartz diorite and gabbro.

MINERALIZATION

Two holes intersected sulphide rich units (A.F. 92736). In hole #9 sections containing up to 70% pyrite in intermediate metavolcanic rock occur between 329.0 and 390.0 ft. (100.3 and 118.9 m). Pyrrhotite and minor chalcopyrite and sphalerite are also present. Other mineralized intervals include 30% pyrrhotite with minor chalcopyrite and sphalerite in intermediate metavolcanic rock from 160.0-165.5 ft. (48.8-50.4 m), and 20% pyrite and pyrrhotite with minor chalcopyrite in diorite from 181.0-182.5 ft. (55.2-55.6 m).

In hole #15 sections containing up to 50% pyrite with pyrrhotite and minor chalcopyrite and sphalerite occur in intermediate metavolcanic rock between 314.5 and 346.0 ft. (95.9-105.5 m).

GEOCHEMICAL DATA

The following assays were obtained from samples collected from the drillholes:

Interval	%Cu	%Zn	oz. Ag/ton (g Ag/t)
hole 9			
160.0-161.5 ft. (48.8-49.2 m)	0.11	0.03	0.14 (4.8)
307.0-312.0 ft. (93.6-95.1 m)	0.48	0.03	0.22 (7.54)
317.0-320.0 ft. (96.6-97.5 m)	0.04		
329.0-337.0 ft. (100.3-102.7 m)	0.08	0.14	0.31 (10.63)
340.0-382.0 ft. (103.6-116.4 m)	0.06	0.36	0.09 (3.09)
384.5-386.5 ft. (117.2-117.8 m)	0.13	0.34	0.10 (3.43)
486.5-489.0 ft. (117.8-149.0 m)	0.12	0.64	0.06 (2.06)
hole 15			
315.5-343.0 ft. (96.2-104.5 m)	0.08	0.29	0.05 (1.71)

CLASSIFICATION

Stratabound massive sulphide type deposit; volcanic rock associated.

REFERENCES

A.F. 91619, 91661, 92735, 92736, 92737 and 92738; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

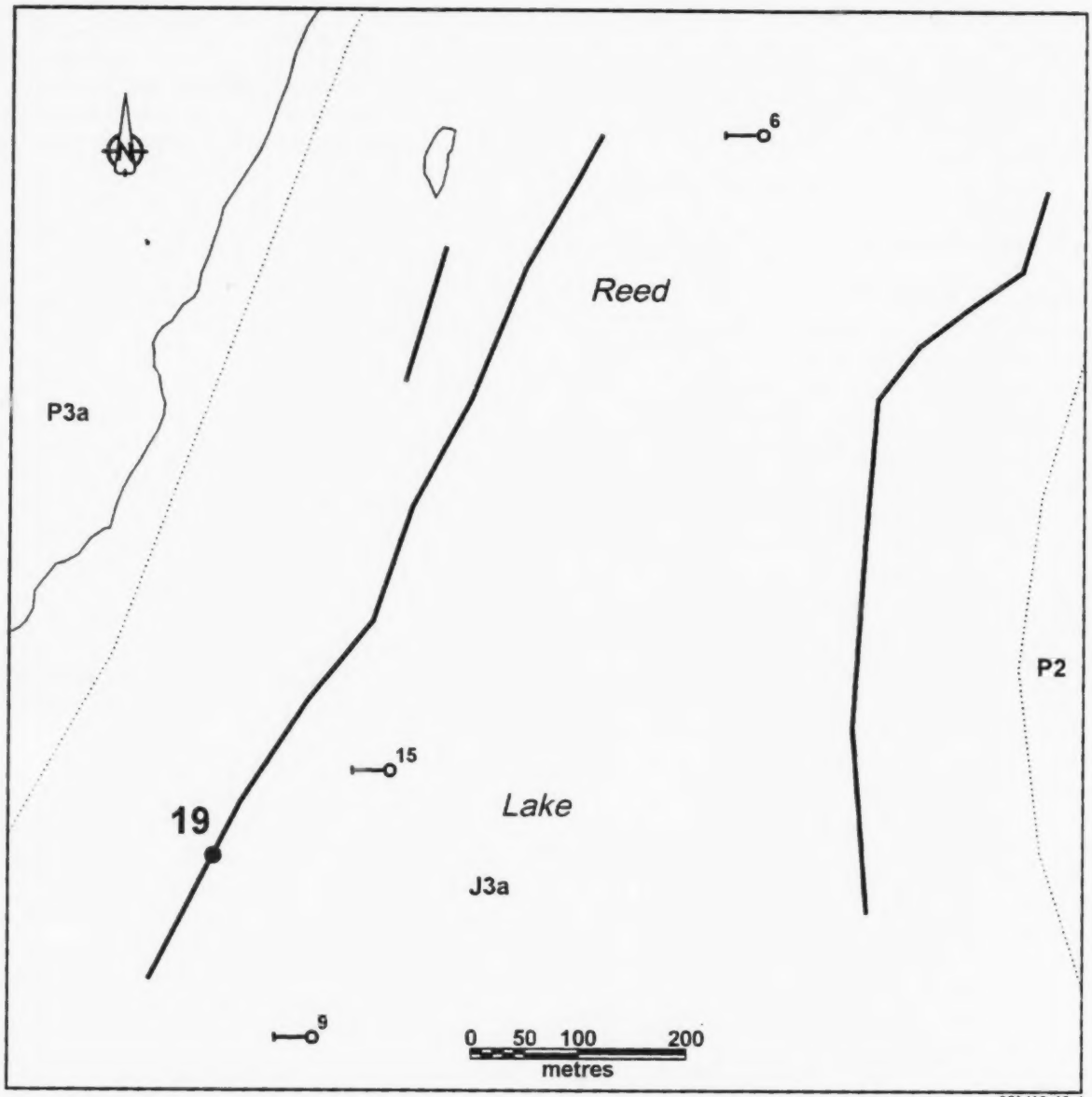
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, 1:50 000 scale.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

..... Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

——— EM conductor (A.F. 92735, 92737)

—o Drillhole (A.F. 92736)

19● Mineral occurrence location

Figure 19-1: Geological setting of CB 2896 occurrence.

LOCATION: 20

NAME:
UTM: 375605 E, 6062335 N
AREA: along south shore of Grass River approximately 3500 m NNW of the north end of Iskwasum Lake.
ACCESS: via boat on Iskwasum Lake and along the Grass River
AIRPHOTO: A26398-159

EXPLORATION SUMMARY

In 1958 Barymin Explorations Limited conducted an HLEM (Ronka) survey that covered this occurrence (A.F. 90274). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). A magnetometer survey was conducted by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90277). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). In 1988 Esso Minerals Canada undertook a program that consisted of 1:5000 scale geological mapping, rock and humus geochemical sampling, and VLF-EM geophysical surveying over the area (A.F. 93083).

Two overgrown and flooded trenches occur a few metres from the Grass River shoreline. Two open cuts up to 1.9 m deep have also been excavated into a low cliff to the NW of the trenches.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 20-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by a plagioclase phyric pillowed basalt member of the McDougalls Point basalt (unit F1a) and diabase (unit P2f) (Syme, 1994). Mafic volcaniclastic rocks (unit F4a) occur to the west, and serpentinites and associated rocks (units F6a and F6b) of the Iskwasum Lake mafic-ultramafic complex occur along the north shore of the Grass River north and east of the occurrence.

The open cuts along the low cliff expose chloritic fragmental rhyolitic lithologies (Fig. 20-2). In the western open cut, rusty-weathering rock is in sharp contact with grey non-limonitic fragmental rhyolite. The contact trends 130° and dips 76° SW. The fragments in the non-limonitic unit consist of a heterolithic assemblage of rounded and equant to elongate lithic clasts 5 to 10 mm in size. Clast rock types consist of aphyric rhyolite and mafic lithologies, possibly basalt. To the east the rock becomes rusty and deeply weathered, but no fresh sulphides were found. The rock is also fragmental, but clast lithologies could not be determined due to iron oxide staining. The matrix contains radiating aggregates of chlorite. The poorly sorted heterolithic character of these rocks suggest that they are debris flows.

MINERALIZATION

One unit is extensively stained with iron oxides, but no sulphides were noted.

GEOCHEMICAL DATA

Sample 8ER-382 collected by Esso Minerals Canada near the occurrence contains 2% pyrite and assayed 0.002 oz. Au/ton (<0.1 g Au/t) (A.F. 93083).

CLASSIFICATION

Stratabound massive sulphide type deposite; volcanic rock associated.

REFERENCES

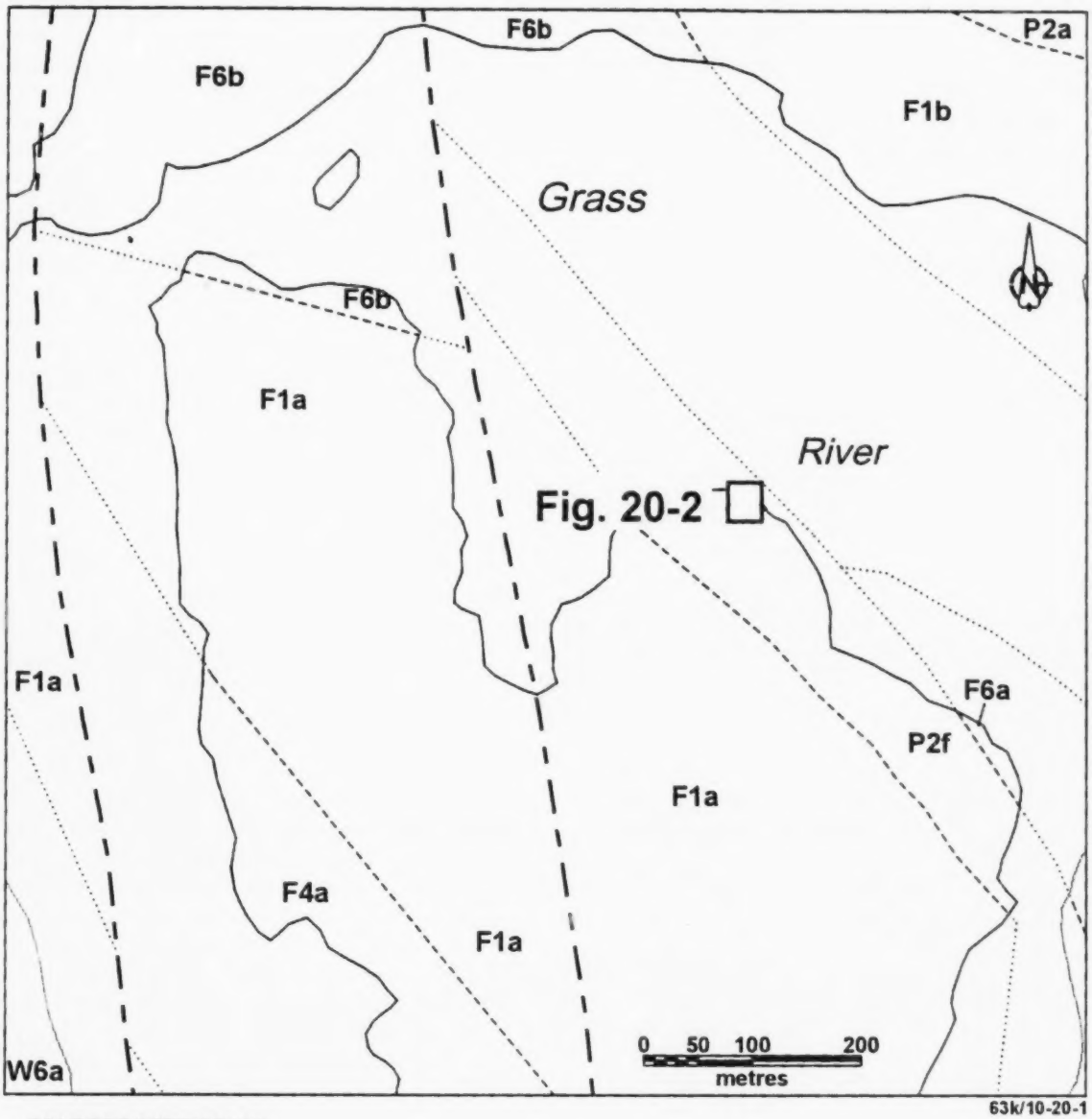
A.F. 90274, 90277, 91564, 91854 and 93083; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- **W6a** Mafic tectonite, phyllonite, mylonite
- **P2a** Gabbro, diorite
- **P2f** Diabase, diabase dyke complex
- **F6a** Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- **F6b** Pyroxenite, peridotite, serpentinite
- **F4a** Mafic volcaniclastic rocks: hyaloclastite, reworked hyaloclastite, mafic wacke
- **F1a** McDougalls Point pillowed and massive basalt, diabase?
- ------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- — — Fault (approximate) -NATMAP Shield Margin Project Working Group, 1998

Figure 20-1: Geological setting of Occurrence 20.

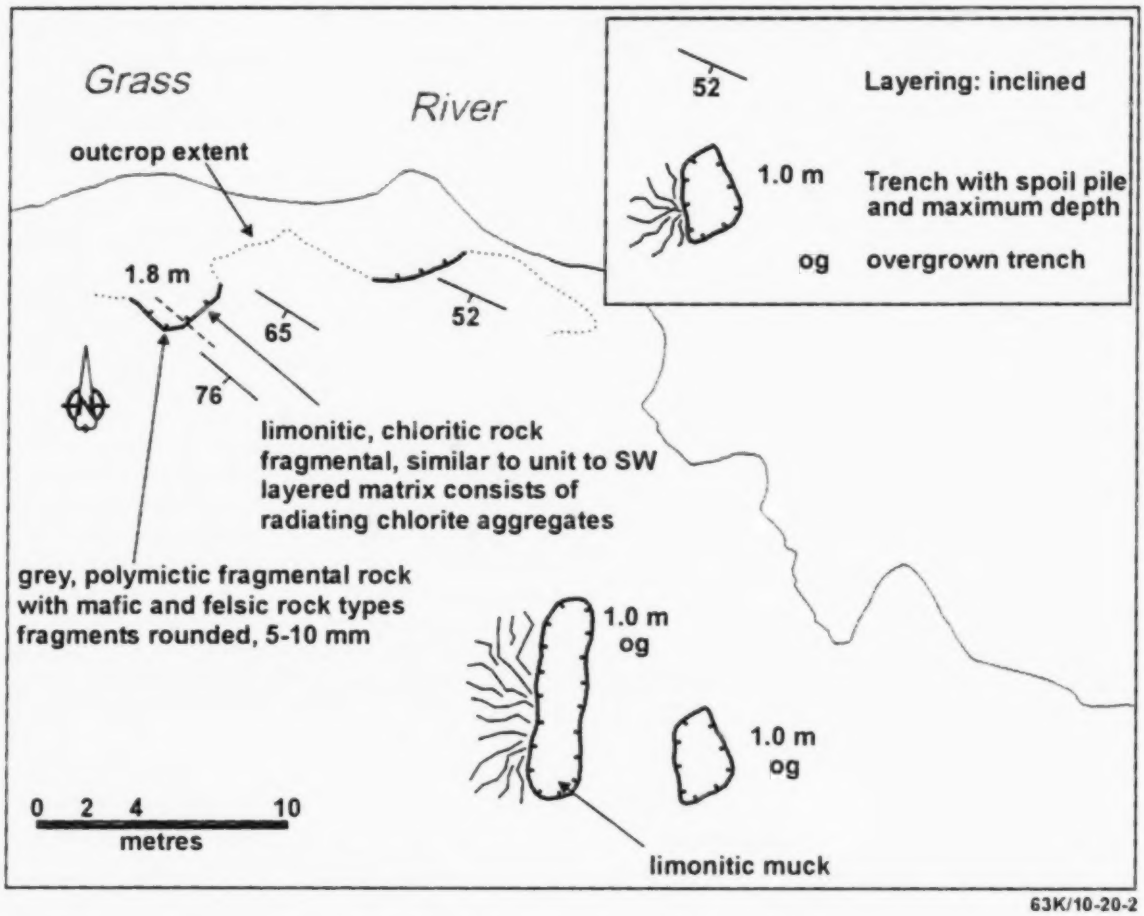


Figure 20-2: Trench locations and geology at Occurrence 20.

LOCATION: 21

NAME:
UTM: 376345 E, 6060950 N
AREA: east side of Grass River north of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake and along Grass River
AIRPHOTO: A26327-10

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Hunt (1970, Map 65-3)) indicated the presence of a gossanous mineral occurrence at this location. Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

An overgrown trench approximately 1 m in diameter and up to 30 cm deep is located on the side of a deadfall-covered hill overlooking the Grass River. No ground exploration work has been reported for this occurrence.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 21-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by diabase that is bounded by a pillowed plagioclase phyric member of the McDougalls Point basalt (unit F1a) to the west and diabase (unit P2f) and gabbro (unit F6a) of the Iskwasum Lake mafic-ultramafic complex to the east (Syme, 1994). The Iskwasum Lake shear zone is located approximately 750 m WSW of the occurrence.

The top of the hill to the east of the occurrence is underlain by a medium to dark brown weathering, massive, medium grained gabbroic rock containing 5-10% grey quartz, 20% acicular hornblende (?) and 70-75% feldspar. Euhedral 1-2 mm magnetite crystals make up to 1% of the rock. Epidotized areas are common. Xenoliths consisting of a fine grained felsic quartz phyric lithology are locally present.

The mafic rocks are cut by a quartz diabase dyke that trends 165°. The eastern margin of the dyke is irregular and its western margin is not exposed. It has a well developed foliation parallel to its eastern contact.

MINERALIZATION

Milky quartz veins occur as tension gashes in the foliated quartz diabase dyke. The quartz veins and masses range from 10 to 50 cm thick and can be traced continuously for approximately 1 m. Much of the quartz is rusty and a few oxidized cubes of disseminated pyrite are present. Black chlorite is a common constituent.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Vein type deposit; multiple veins or lenses.

REFERENCES

A.F. 91564 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Hunt, G.H.

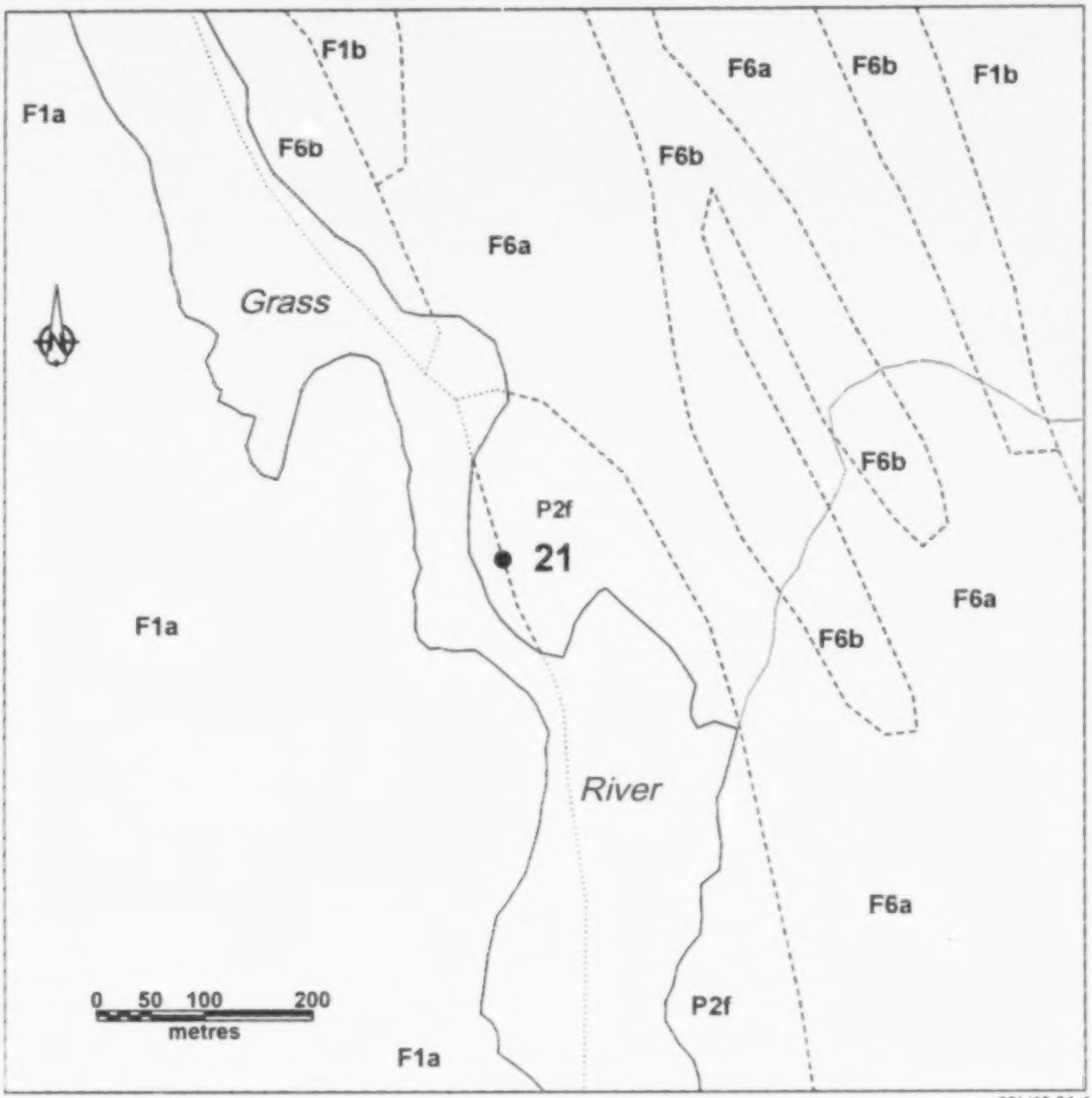
1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- P2f — Diabase, diabase dyke complex
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F6b — Pyroxenite, peridotite, serpentinite
- F1a — McDougalls Point pillowed and massive basalt, diabase?
- F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- 21 — Mineral occurrence location

Figure 21-1: Geological setting of Occurrence 21.

LOCATION: 22

NAME: mineralization intersected by diamond drilling
UTM: 382835 E, 6062800 N
AREA: Barb Lake area north of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake, traverse along portage to Barb Lake then via boat.
AIRPHOTO: A26326-97

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279). Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). An EM (Turam) survey was performed and a number of the conductive responses were drilled by Hudson Bay Exploration and Development Company, Limited in 1970-71 (A.F. 90278). Following VLF-EM and HLEM surveys (A.F. 92848), Granges Exploration Ltd. drilled 6 holes on the property in 1988 (A.F. 92849).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 22-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by the Claw Bay basalt and derived tectonite (unit F1b) (Syme, 1994). Tonalite (unit P6a) and a xenolith-rich phase (unit P6e) of the Elbow Lake pluton intrude the sequence to the west, and gabbro, gabbro pegmatite and leucogabbro (unit F6a) occur along the eastern shoreline of Barb Lake east of the occurrence. The rocks in the area trend NNE with a moderate to steep ESE dip. Electromagnetic conductors parallel the regional foliation in the area.

The lithologic descriptions for hole BARB-3 indicate the host sequence for the mineralization consists of epiclastic metasedimentary rocks comprising a sequence of metamorphosed "...argillite... greywacke... (and) ...pebbly arkose" (A.F. 92849). It is unclear if the banded character of this sequence is a primary depositional feature or tectonically induced.

MINERALIZATION

Drillhole BARB-3 intersected 11.65 m of poorly sorted, angular to subrounded breccia, consisting of poorly sorted, angular to subrounded clasts, and containing 5 to >50% stringer and "massive" banded sulphides. Pyrrhotite is the dominant sulphide with subordinate pyrite (A.F. 92849).

GEOCHEMICAL DATA

The following assays were obtained from the mineralized interval in hole BARB-3 (A.F. 92849):

Interval	%Cu	%Zn	g Ag/t	g Au/t
55.85-65.85 m	0.03	0.05	1.73	0.12

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation (?).

REFERENCES

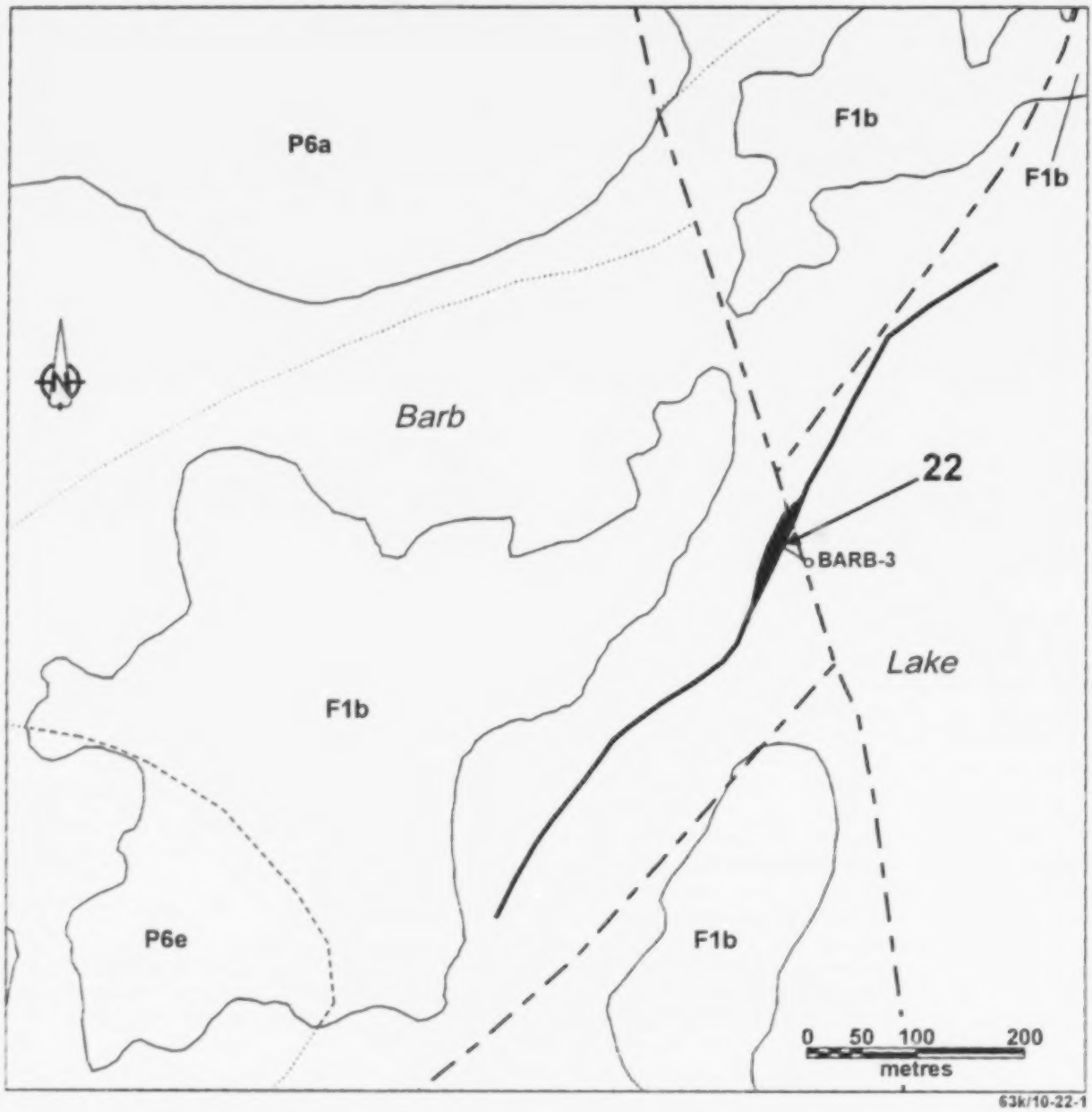
A.F. 90278, 90279, 90281, 91854, 92848 and 92849; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- P6a Tonalite
- P6e Tonalite: xenolith-rich phase
- F1b Claw Bay pillowed and massive basalt, diabase, derived tectonite
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 92848)
- Drillhole (A.F. 92849)
- 22 Mineral occurrence location

Figure 22-1: Geological setting of Occurrence 22.

LOCATION: 23

NAME: mineralization intersected by diamond drilling
UTM: 382880 E, 6061600 N
AREA: Barb Lake, north of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake, traverse along portage to Barb Lake then via boat.
AIRPHOTO: A26326-97

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279). Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). Following VLF-EM and HLEM surveys (A.F. 92848), Granges Exploration Ltd. drilled 6 holes on the property in 1988 (A.F. 92849).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 23-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by the Claw Bay basalt and derived tectonite (unit F1b) (Syme, 1994). Gabbro, gabbro pegmatite and leucogabbro (unit P6a) of the Iskwasum Lake mafic-ultramafic complex occurs to the east and tonalite (unit P6a) of the Iskwasum Lake stock occurs to the SW of the occurrence.

The lithologic descriptions for hole BARB-2 indicate the host sequence for the mineralization consists of epiclastic metasedimentary rocks comprising metamorphosed "...argillite... greywacke... (and) ...pebbly arkose" (A.F. 92849). It is unclear if the texture of this "layered" sequence is a tectonite fabric or a primary feature.

MINERALIZATION

Drillhole BARB-2 intersected a 1.6 m interval containing 3 to 35% pyrite as stringers and near solid sulphides (A.F. 92849).

GEOCHEMICAL DATA

The following assays were obtained from the mineralized interval in hole BARB-2 (A.F. 92849):

Interval	%Cu	%Zn	g Ag/t	g Au/t
37.3-40.3 m	0.04	0.04	0.66	0.23

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation (?)

REFERENCES

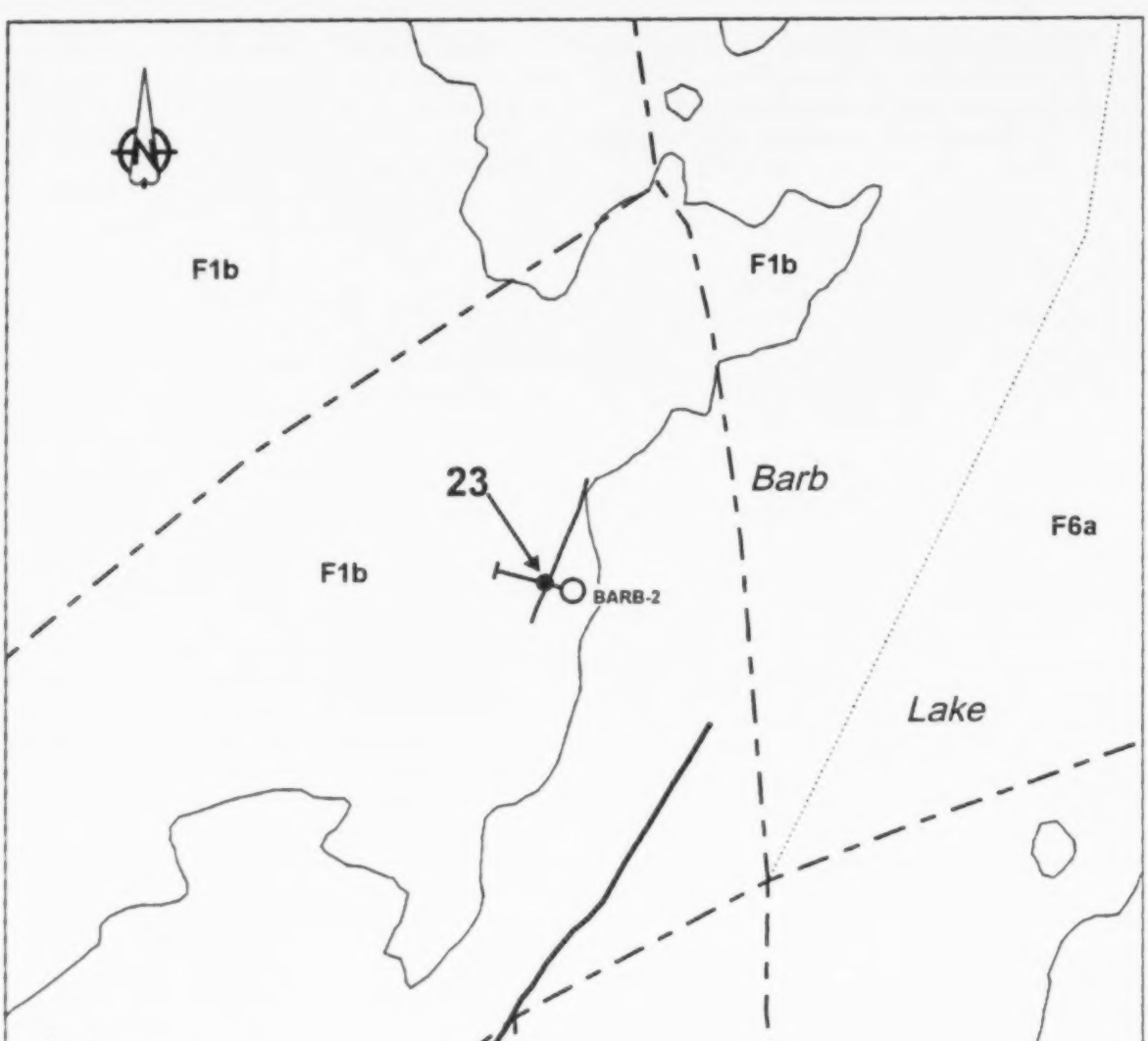
A.F. 90279, 90281, 91854, 92848 and 92849; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

F6a Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

F1b Claw Bay pillowed and massive basalt, diabase, derived tectonite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project WorkingGroup, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92849)

Drillhole (A.F. 92849)

● 23 Mineral occurrence location

Figure 23-1: Geological setting of Occurrence 23.

LOCATION: 24

NAME: R.G.
UTM: 373795 E, 6060665 N
AREA: approximately 3300 m NW of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake and along Grass River, then traverse
AIRPHOTO: A26237-190

EXPLORATION SUMMARY

In 1949 six holes were drilled east of Campbell Lake (unofficial name) to test a north-striking fault zone that has associated gold mineralization (A.F. 90284; Mineral Inventory File 734). Additional drilling was performed on the property about 1951 and an electromagnetic survey was undertaken in 1958 (Mineral Inventory File 734). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). In 1988 Esso Minerals Canada undertook a program east of the occurrence that included 1:5000 scale geological mapping, rock and humus geochemical sampling, and a VLF-EM geophysical survey (A.F. 93083).

Fifteen trenches, most of which are flooded, overgrown, or were only excavated into overburden, were located during the field examination of the occurrence.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 24-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The regional geological map indicates that the area is underlain by the McDougalls Point basalt (unit F1a) (Syme, 1994).

The location of the trenches is shown in Fig. 24-2. Outcrops to the east of the trenches expose fine grained, dark grey, pillowed mafic volcanic rocks. The host of the occurrence is a brown weathering, banded (layered?), magnetite rich rock that is probably an oxide-facies iron formation. The layers trend northerly and have a subvertical dip. Weathered pits on the outcrop surface indicate that parts of this unit are calcareous. This unit corresponds to a small high on total field and vertical gradient magnetic maps (Geological Survey of Canada, 1983a, b). A massive, unfoliated granitic (quartz diorite) intrusion of unknown extent occurs several tens of metres SE of the main group of trenches. Shallow trenches have also been excavated in quartz veins and lenses at a number of locations in the intrusion.

MINERALIZATION

Fine grained magnetite and up to 5% euhedral pyrite are disseminated throughout the iron formation. A quartz stringer network, exposed in the trenches, contains up to 10% euhedral pyrite crystals to 20 mm.

GEOCHEMICAL DATA

None.

CLASSIFICATION

Vein type deposit; multiple veins or lenses. Quartz veins associated with magnetite bearing iron formation. The white quartz veins are atypical for those associated with other gold occurrences of the area in that they are poorly defined and show diffuse boundaries with the enclosing rock.

REFERENCES

A.F. 90284, 91564, 91854, 92472 and 93083; Cancelled Assessment Files, Manitoba Energy and Mines, Minerals Division.

Geological Survey of Canada

1983a: Experimental colour compilation (high resolution aeromagnetic total field), Iskwasum Lake, Manitoba (NTS 63K/10); Geological Survey of Canada, Map C 20, 341 G, 1:50 000 scale.

1983b: Experimental colour compilation (high resolution aeromagnetic vertical gradient), Iskwasum Lake, Manitoba (NTS 63K/10); Geological Survey of Canada, Map C 40, 082 G, 1:50 000 scale.

Mineral Inventory File No. 734

Manitoba Energy and Mines, Geologic Services

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

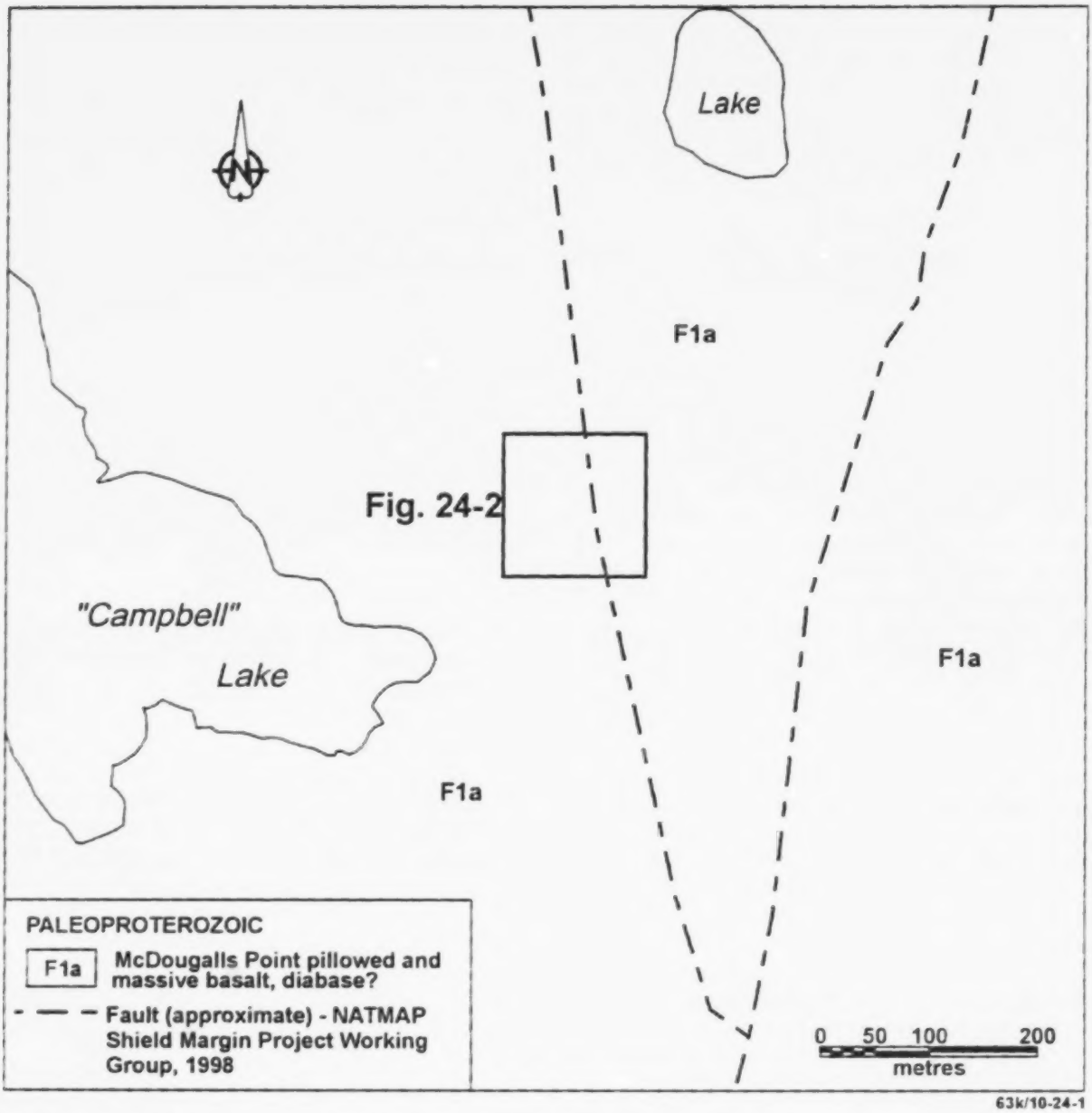


Figure 24-1: Geological setting of R.G. occurrence.

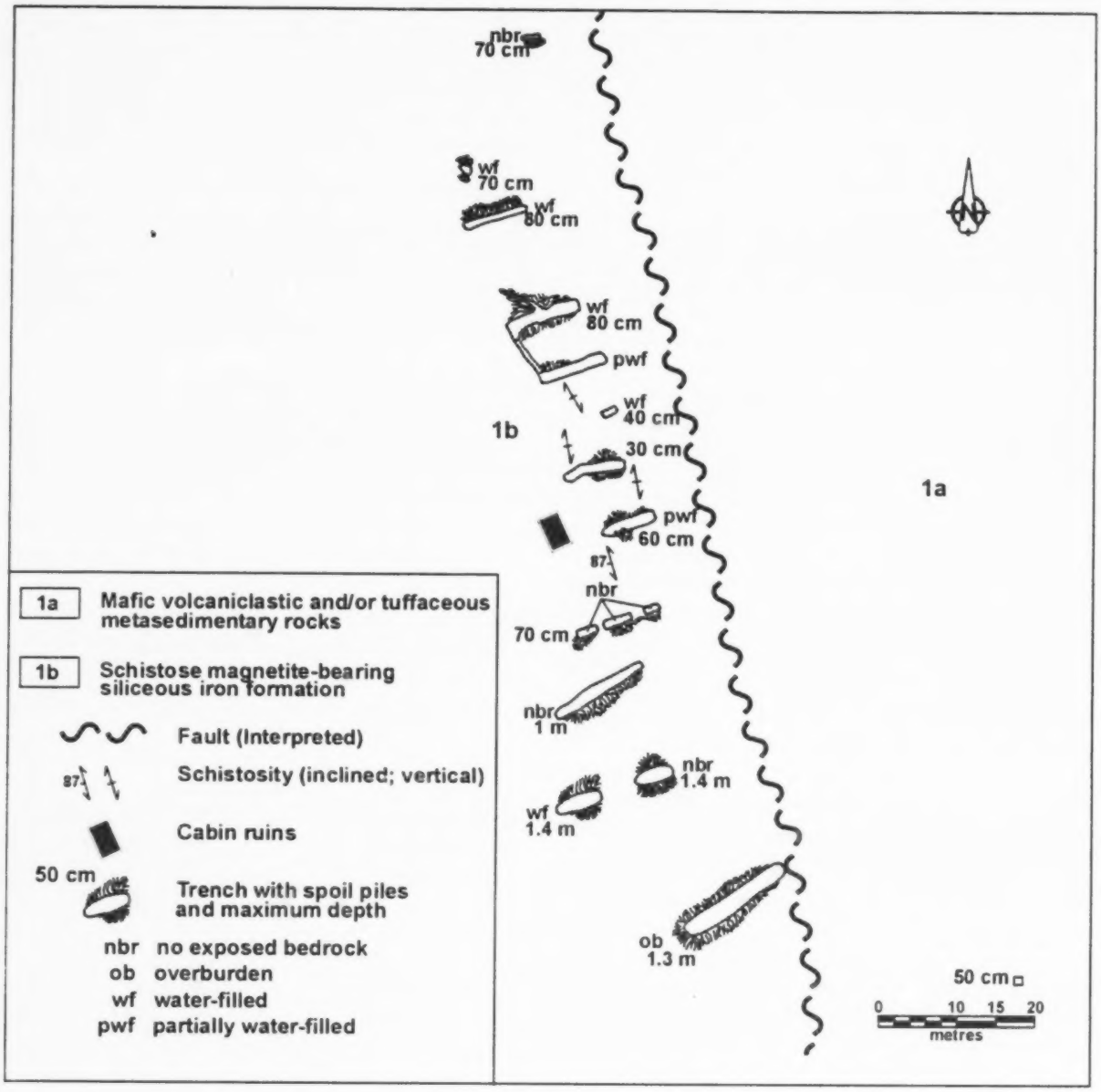


Figure 24-2: Geology and trench locations at R.G. occurrence.

LOCATION: 25

NAME: Law zone
UTM: 376720 E, 6058390 N
AREA: under north end of Iskwasum Lake south of Grass River
ACCESS: via boat on Iskwasum Lake from Iskwasum provincial campground at Provincial highway 39.
AIRPHOTO: A26327-8

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). In the mid and late 1960's, Hudson Bay Mining and Smelting Company, Limited performed ground EM surveys in the area and drilled some of the conductive responses. Minor nickel mineralization was found during this program (Hudson Bay Exploration and Development, pers. comm. 1996). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 25-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a), and pyroxenite, peridotite and serpentinite (unit F6b) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). McDougalls Point basalt (unit F1a) occurs a short distance to the west of the occurrence. Mafic tectonite, phyllonite and mylonite (unit W6a) of the Iskwasum Lake shear zone occur approximately 400 m to the WSW.

The nickel mineralization occurs in a serpentinite body under the north end of Iskwasum Lake (Hudson Bay Exploration and Development, pers. comm. 1996). This unit shows up as a distinctive feature in the magnetic maps of the area (Geological Survey of Canada, 1983a, b).

MINERALIZATION

Disseminated millerite occurs in some areas of the serpentinite. Minor disseminated pyrrhotite and pyrite are also present. The serpentinite contains high background nickel values that average 0.2-0.3% that are probably associated with silicate phases. The serpentinite also contains moderate to high (up to 50%) quantities of disseminated magnetite (Hudson Bay Exploration and Development, pers. comm. 1996).

GEOCHEMICAL DATA

The best assays for the Law zone returned 1.96% Ni across 2.6 ft. (0.8 m) and 2.3% Ni across 2.3 ft. (0.7 m). Assays of the peridotite returned fairly consistent values of 0.2 to 0.3% Ni (Hudson Bay Exploration and Development, pers. comm. 1996).

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated.

REFERENCES

A.F. 91564, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Geological Survey of Canada

1983a: Experimental colour compilation (high resolution aeromagnetic total field), Iskwasum Lake, Manitoba (NTS 63K/10); Geological Survey of Canada, Map C 20, 341 G, 1:50 000 scale.

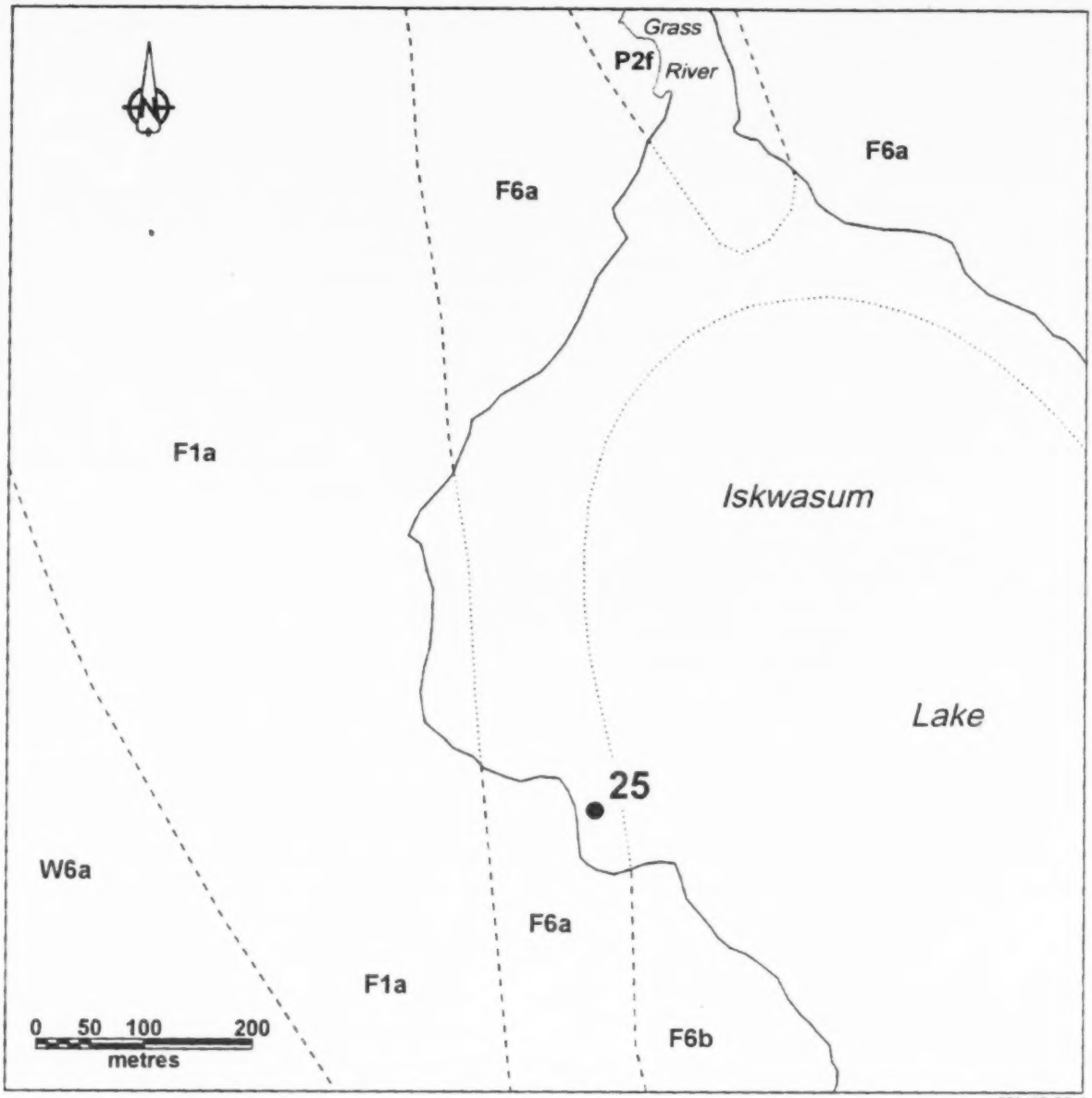
1983b: Experimental colour compilation (high resolution aeromagnetic vertical gradient), Iskwasum Lake, Manitoba (NTS 63K/10); Geological Survey of Canada, Map C 40, 082 G, 1:50 000 scale.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

W6a Mafic tectonite, phyllonite, mylonite

P2f Diabase, diabase dyke complex

F6a Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

F6b Pyroxenite, peridotite, serpentinite

F1a McDougalls Point pillowed and massive basalt, diabase?

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

25 Mineral occurrence location

Figure 25-1: Geological setting of Law zone occurrence.

LOCATION: 26

NAME: Reed Lake gabbro
UTM: 394045 E, 6055125 N
AREA: west side of Reed Lake
ACCESS: via boat on Reed Lake and along Grass River, then traverse
AIRPHOTO: A26325-188

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). A study by Young and Ayres (1985) of mafic/ultramafic intrusions in the Flin Flon-Snow Lake area suggested that the Reed Lake gabbro had potential to host base and/or precious metals, particularly platinum group elements. Platinum Exploration Canada Inc. undertook a geological mapping and geochemical sampling program in 1986 (A.F. 93097). An airborne geophysical survey over the Reed Lake gabbro was performed for International Platinum Corporation in 1988 (A.F. 92971). No other exploration work appears to have been performed over the property. There is abundant outcrop in the area but it is generally obscured by thick lichen cover, making the task of delineating rock units in the field difficult.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 26-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by layered pyroxenite, peridotite and subordinate gabbro (unit F6d) and layered gabbro, leucogabbro and anorthosite (unit F6c) of the Reed Lake mafic-ultramafic complex (Reed Lake gabbro of Williamson, 1992, 1993).

This intrusive complex has a strike length north of the Berry Creek fault of approximately 12 km, and a thickness of approximately 4 km. Following on the work of Young and Ayres (1985), investigations by Williamson (1992, 1993) show that the gabbro is a layered intrusion consisting of a variety of interlayered gabbroic rocks including anorthositic, leuco- and mela-gabbros, and pyroxenites. The eastern part of the intrusion is prominently layered as defined by its magnetic response (A.F. 92971), a feature particularly evident in the derived vertical gradient map. Intrusive breccias and dykes occur throughout the the intrusion, but their distribution has not been determined.

MINERALIZATION

The striped magnetic response in the eastern (lower?) part of the intrusion (A.F. 92971) appears to be related to mafic magnetite-bearing layers. Minor disseminated chalcopyrite was found in a magnetite rich rock along the Grass River approximately 1 km west of the interpreted eastern margin of the intrusion.

GEOCHEMICAL DATA

The following anomalous platinum group element values were obtained from some rock samples collected from the southeastern and east-central part of the intrusion (A.F. 93097):

Sample No.	Pt (ppb)	Pd (ppb)	Cr (ppm)
PLAT-58	101	247	nd.
PLAT-68	118	117	2200
PLAT-85C	134	228	350

Williamson (1993) obtained anomalous PGE values in samples collected from the same area:

Pt (ppb)	Pd (ppb)
117	134
89	176

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated.

REFERENCES

A.F. 91619, 91661, 92971 and 93097; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

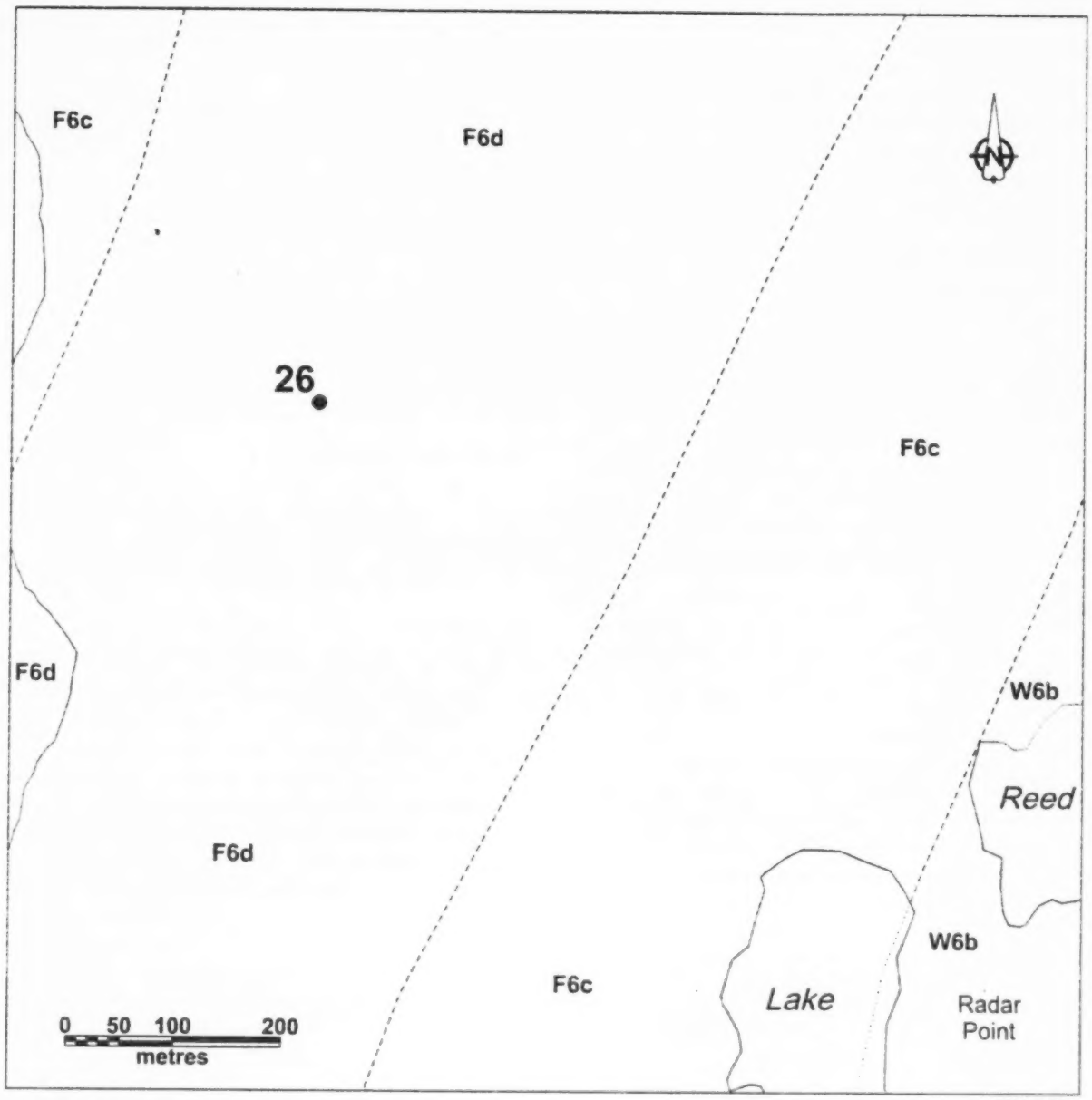
Williamson, B.L.

1992: Reed Lake Gabbro project; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.

Young, J. and Ayres, L.D.

1985: Characterization of mafic-ultramafic rocks in the Flin Flon-Snow Lake area, Manitoba; unpublished report to the Geological Survey of Canada, Contract OST84-00087, 59 p.



PALEOPROTEROZOIC

- W6b — Mafic tectonite with mafic-felsic intrusive sheets
- F6c — Layered gabbro, leucogabbro, anorthosite
- F6d — Layered pyroxenite, peridotite, subordinate gabbro

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- 26 ● Mineral occurrence location

Figure 26-1: Geological setting of Occurrence 26.

LOCATION: 27

NAME: Oro Group
UTM: 398935 E 6051715 N
AREA: near north shore of Bartlett Point south of Fourmile Island, Reed Lake
ACCESS: via boat from Reed Lake provincial campground, then traverse
AIRPHOTO: A26325-26

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661).

Several trenches are indicated in A.F. 92740 and 92741, which describe ground magnetic and electromagnetic surveys over the occurrence. Records indicating when these trenches were excavated have not been found. Several drillhole collars were found in the vicinity of the trenches, but no open assessment files are available that provide additional information about the work performed on the property. Only one trench was free of vegetation and not flooded. The other trenches are overgrown and bedrock is poorly exposed.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 27-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by tonalite (unit P6a). Tholeiitic basalt, basaltic andesite, gabbro and derived amphibolite (unit J1a), and mafic phyllonite±carbonate and cataclasite (unit W6c) that comprise the Berry Creek fault, occur to the north of the occurrence. Ordovician dolostone outcrops approximately 100 m to the north of the trenches.

The trenches and several stripped outcrops (Fig. 27-2) expose coarse-grained (up to 5 mm) quartz phenocryst (to 80%) tonalite similar to that exposed on Fourmile Island to the north.

MINERALIZATION

A single quartz vein and several disconnected lenses are exposed in the eastern-most trench. The vein is up to 20 cm thick and is located in a fault. The surrounding rocks are impregnated by thin irregular quartz masses and stringers that locally form a weakly developed stockwork.

GEOCHEMICAL DATA

None.

CLASSIFICATION

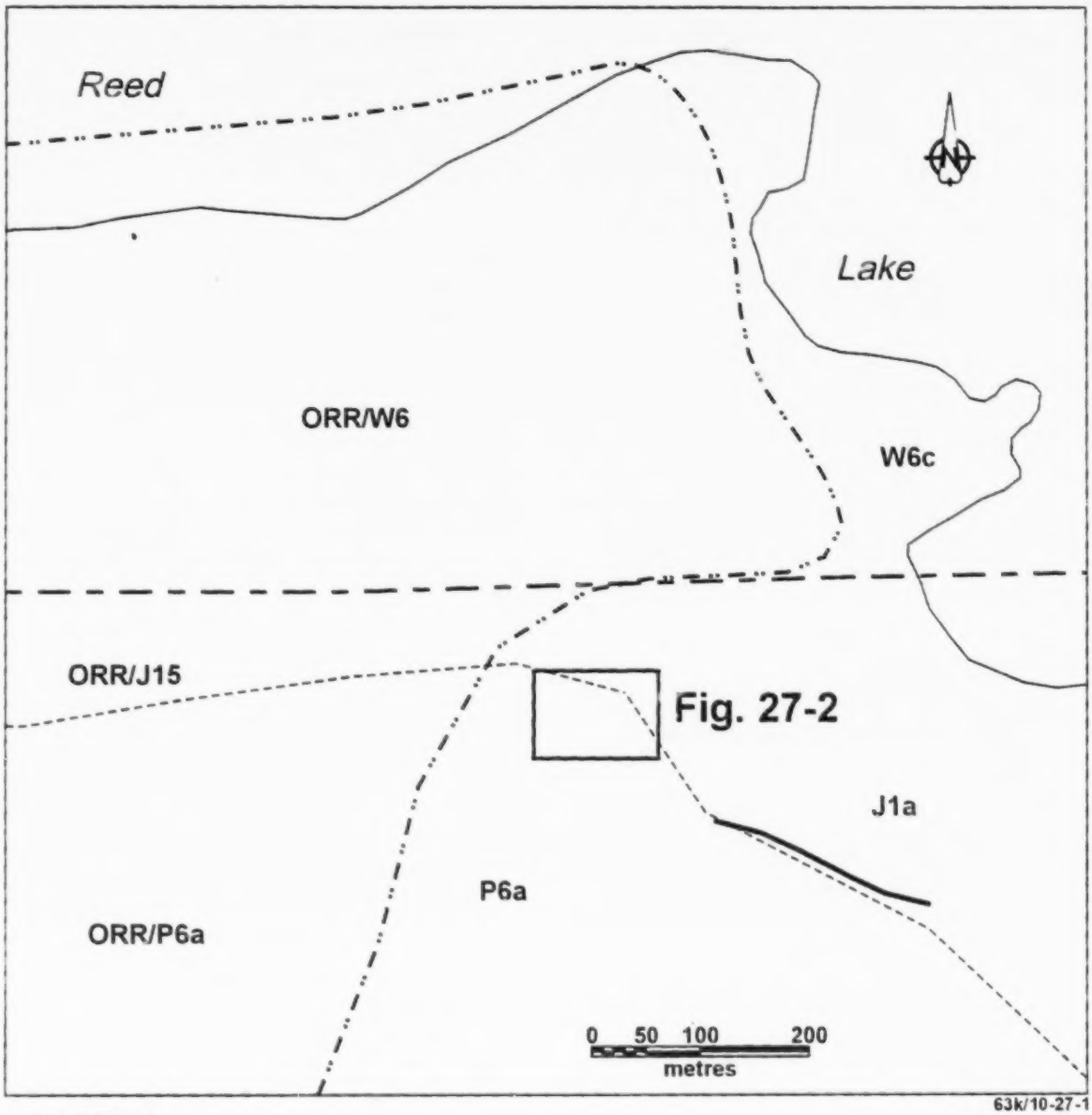
Vein type deposit; multiple veins or lenses.

REFERENCES

A.F. 91661, 91708, 92740 and 92741; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOZOIC

ORR Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6 Tectonite, phyllonite, mylonite

W6c Mafic phyllonite ± carbonate, cataclasite

P6a Tonalite

J15 Undivided juvenile arc rocks

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

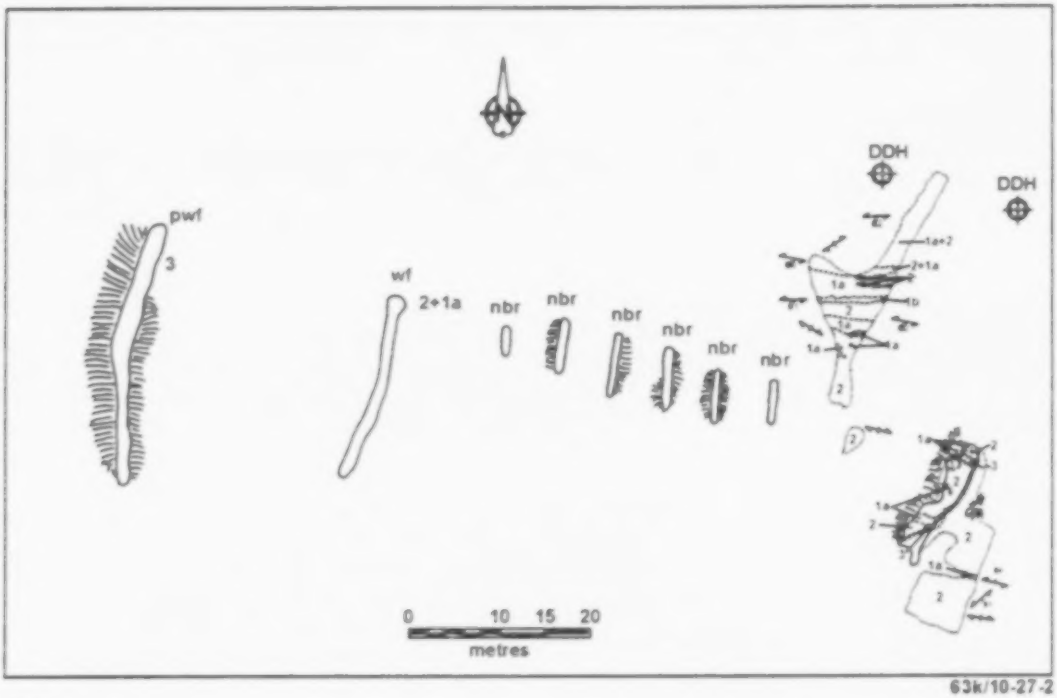
Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

Phanerozoic boundary - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92740, 92741)

Figure 27-1: Geological setting of Oro Group occurrence.



63k/10-27-2

3 Quartz vein

2 Tonalite, quartz granitoid
60-75% quartz grains to 5 mm, can show variation in quantity and grain size
common xenoliths of unit 1a and 2
occasional quartz fracture fillings
shows patchy Fe carbonatization

1a Fine-grained mafic rock
moderately to very schistose, 10-20% Fe-carbonate

1b Fine grained mafic rock, shows compositional banding, possible tuff or sheared interval

Geological contact (approximate)

Foliation (inclined; vertical)

Outcrop

Trench with spoil pile

pwf partially water-filled
wf water-filled
nbr no bedrock exposed

Drillhole location

Figure 27-2. Geology and trench locations at Oro Group occurrence.

LOCATION: 28

NAME: mineralization intersected by diamond drilling
UTM: 383195 E, 6060415 N
AREA: Barb Lake area north of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake, traverse along portage to Barb Lake then via boat.
AIRPHOTO: A26326-78

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279). Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). Following VLF-EM and HLEM surveys (A.F. 92848), Granges Exploration Ltd. drilled 6 holes on the property in 1988 (A.F. 92849).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 28-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). Massive and pillowed basalt and derived tectonite (unit F1b) of the Claw Bay basalt occur to the west. The rock sequence in the area trends NNE with a moderate to steep ESE dip. Electromagnetic conductors tend to parallel the regional foliation in the area.

The lithologic description for hole BARB-6 describes the host sequence for the mineralization as consisting of epiclastic metasedimentary rocks, comprising a sequence of metamorphosed greywacke and argillite (A.F. 92849). It is unclear if the layered character of the sequence is primary or tectonic.

MINERALIZATION

Hole BARB-6 intersected a 0.75 m section containing 25% banded sulphides (pyrrhotite and pyrite) underlain by a 1.75 m interval containing lesser sulphide as discrete bands.

GEOCHEMICAL DATA

The following assays were obtained from the mineralized interval in hole BARB-6 (A.F. 92849):

Interval	Au (g/t)	Ag (g/t)	%Cu	%Zn
29.5-30.5 m	0.15	0.16	tr	tr
30.5-31.5 m	0.10	1.27	0.05	0.14
31.5-32.5 m	0.09	0.90	0.04	0.10
32.5-33.5 m	0.09	0.68	0.02	0.04
33.5-34.0 m	0.08	0.43	0.01	0.01

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated. The rocks may have been strongly sheared.

REFERENCES

A.F. 90279, 90281, 91854, 92472, 92848 and 92849; Cancelled Assessment File, Manitoba Energy and Mines Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

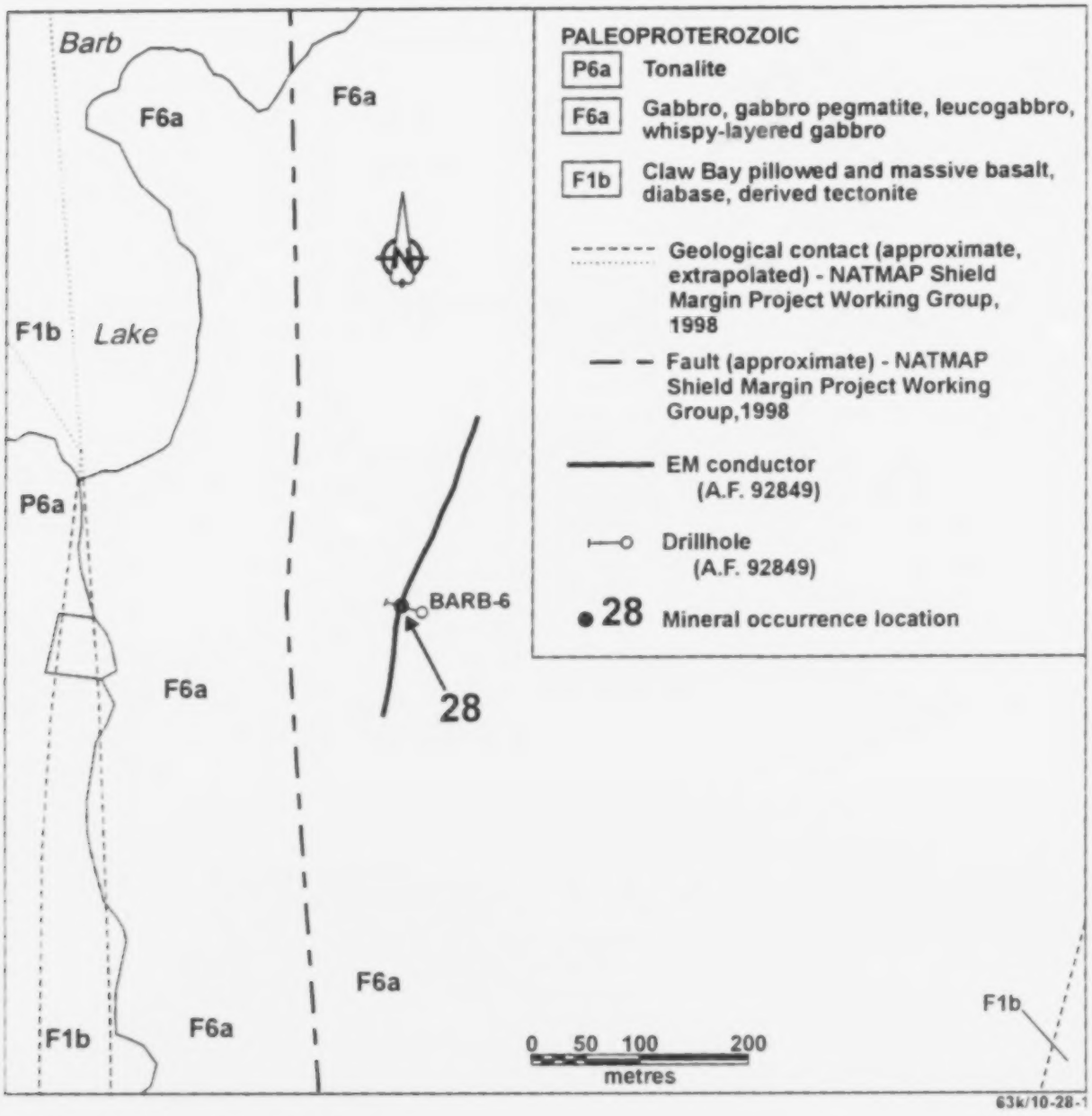


Figure 28-1: Geological setting of Occurrence 28.

LOCATION: 29

NAME: mineralization intersected by diamond drilling
UTM: 375865 E, 6068280 N
AREA: along west side of Grass River, approximately 750 m NNE of eastern railway bridge across Grass River.
ACCESS: via bush plane or boat on the Cranberry Lakes and Elbow Lake from Cranberry Portage and traverse, or by vehicle from Snow Lake along abandoned CNR rail line roadbed and traverse
AIRPHOTO: MB90025-131

EXPLORATION SUMMARY

Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). Gränges Exploration AB performed HLEM (MaxMin II) surveys in the Grass River area south of Elbow Lake. Some of the conductive responses were drilled in 1981 (A.F. 93256).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 29-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by pillowed and massive McDougalls Point basalt (unit F1a) (Syme, 1993; 1994). Mafic tectonite, phyllonite and mylonite (unit W6a) of the Elbow Lake shear zone derived from basalt occur to the SE. The basalt-tectonite assemblage is bounded to the east and west by tonalite (unit P6a) of the Elbow Lake pluton.

Drillhole BE-79 intersected a sequence of mafic metavolcanic rocks and schistose equivalents with minor quartz porphyry (tonalite?) (A.F. 93256).

MINERALIZATION

Drillhole BE-79 intersected an 8.1 ft. (2.5 m) interval of graphite schist containing 10-20% pyrite (A.F. 93256).

GEOCHEMICAL DATA

Assays of the mineralized interval returned only minor Au, Ag, Cu and Zn values.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The rocks at this location appear to have been at least moderately sheared and are graphitic, suggesting a biogenic contribution.

REFERENCES

A.F. 91564 and 93256; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

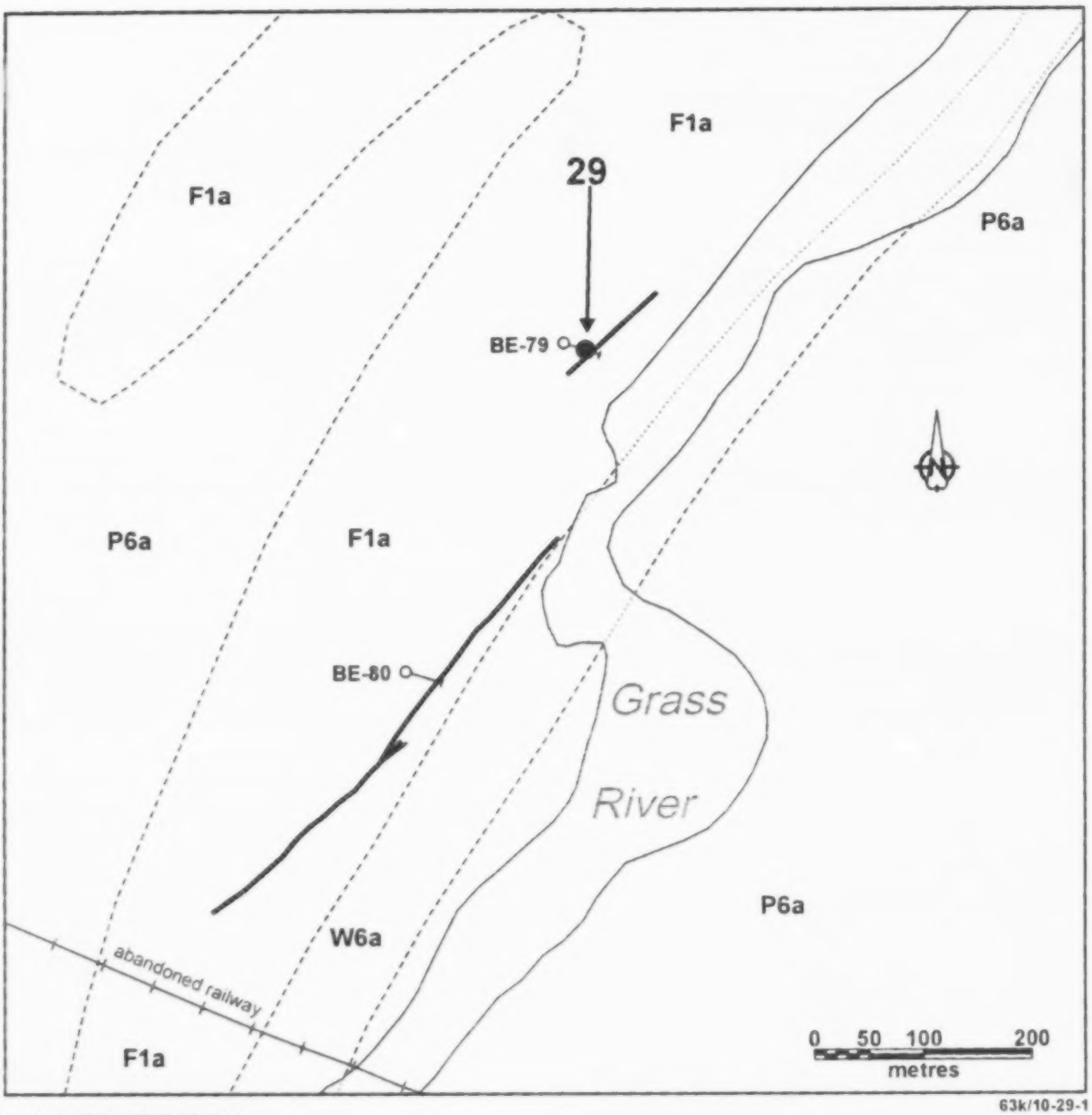
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1993: Cranberry-Simonhouse reconnaissance; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1993, p. 61-66.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P6a — Tonalite
- F1a — McDougalls Point pillowed and massive basalt, diabase?
- ------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

- EM conductor (A.F. 93256)
- Drillhole (A.F. 93256)
- ● 29 Mineral occurrence location

Figure 29-1: Geological setting of Occurrence 29.

LOCATION: 30

NAME: mineralization intersected by diamond drilling
UTM: 375720 E 6067975 N
AREA: along west side of Grass River, approximately 400 m NNE of eastern railway bridge across Grass River.
ACCESS: via bush plane or boat on the Cranberry lakes and Elbow Lake from Cranberry Portage and traverse, or by vehicle from Snow Lake along abandoned CNR rail line roadbed and traverse.
AIRPHOTO: MB90025-131

EXPLORATION SUMMARY

Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). Gränges Exploration AB performed HLEM (MaxMin II) surveys in the Grass River area south of Elbow Lake. Some of the conductive responses were drilled in 1981 (A.F. 93256).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 30-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by pillowed and massive McDougalls Point basalt (unit F1a) (Syme, 1993; 1994). Mafic tectonite, phyllonite and mylonite of the Elbow Lake shear zone, derived from the enclosing basalt, occur to the SE. The basalt-tectonite assemblage is bounded to the east and west by tonalite (unit P6a) of the Elbow Lake pluton.

Drillhole BE-80 intersected a sequence dominated by quartz porphyry (tonalite?) with lesser intervals of mafic schist (A.F. 93256).

MINERALIZATION

The intersected mineralized intervals total 70.6 ft. (21.5 m) and contain 20-30% graphite and 5-20% pyrite (A.F. 93256).

GEOCHEMICAL DATA

Assays of the mineralized interval returned only minor Au, Ag, Cu and Zn values.

CLASSIFICATION

Chemical-sedimentary type deposit; sulphide facies iron formation. The rocks at this location appear to have been at least moderately sheared and are graphitic. The graphite suggests a biogenic contribution to this sequence.

REFERENCES

A.F. 91564 and 93256; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

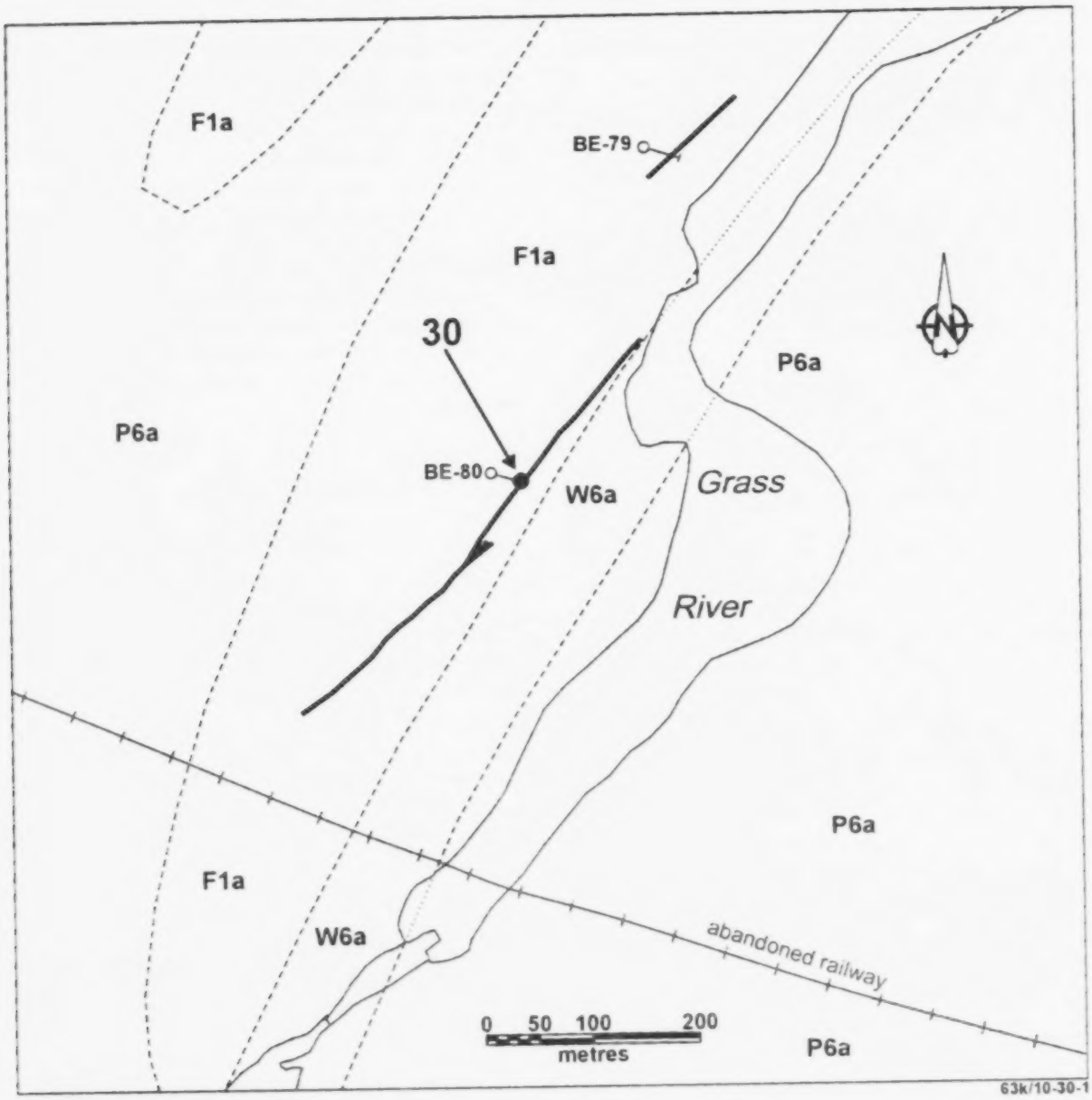
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1993: Cranberry-Simonhouse reconnaissance; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1993, p. 61-66.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P6a — Tonalite
- F1a — McDougalls Point pillowed and massive basalt, diabase?
- ------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 93256)
- Drillhole (A.F. 93256)
- ● 30 Mineral occurrence location

Figure 30-1: Geological setting of Occurrence 30.

LOCATION: 31

NAME: mineralization intersected by diamond drilling
UTM: 373150 E 6067505 N
AREA: south of abandoned CNR railway line approximately 1300 m NE of Third Cranberry Lake.
ACCESS: via boat from Cranberry Portage on the Cranberry lakes and along the Grass River, then traverse.
AIRPHOTO: MB90025-212

EXPLORATION SUMMARY

Cyprus Exploration Corporation Limited performed an EM (Loop Frame system) and magnetometer survey over the area in 1955 (A.F. 90282). Several of the geophysical responses were drilled by Cyprus Exploration Corporation Limited in 1956 (A.F. 90503). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 31-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by pillowed and massive basalt (unit F1a) of the McDougalls Point basalt (Syme, 1993; 1994). This sequence includes synvolcanic diabase dykes and sills, massive flows and lesser volcaniclastic and epiclastic metasediments. The Elbow Lake shear zone, and the Grass River Fault transect the sequence. The supracrustal and associated sequence is bounded to the SE and NW by granitic rocks (unit P9b) of the Elbow Lake pluton.

DDH 9 and 10 intersected well foliated mafic volcanic rocks and a medium grained granitic unit (A.F. 90503).

MINERALIZATION

Hole 9 intersected a 19 ft. (5.8 m) interval containing up to 20% disseminated pyrite and minor graphite. Hole 10 intersected two intervals, over 3.5 and 3.0 ft. (1.1 and 0.9 m) containing up to 5% pyrite and 70% graphite (A.F. 90503).

GEOCHEMICAL DATA

No assay results were reported for samples collected from drill core.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The rocks at this location appear to have been at least moderately sheared. Their graphitic character suggests a biogenic contribution.

REFERENCES

A.F. 90282, 90503, 91564 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

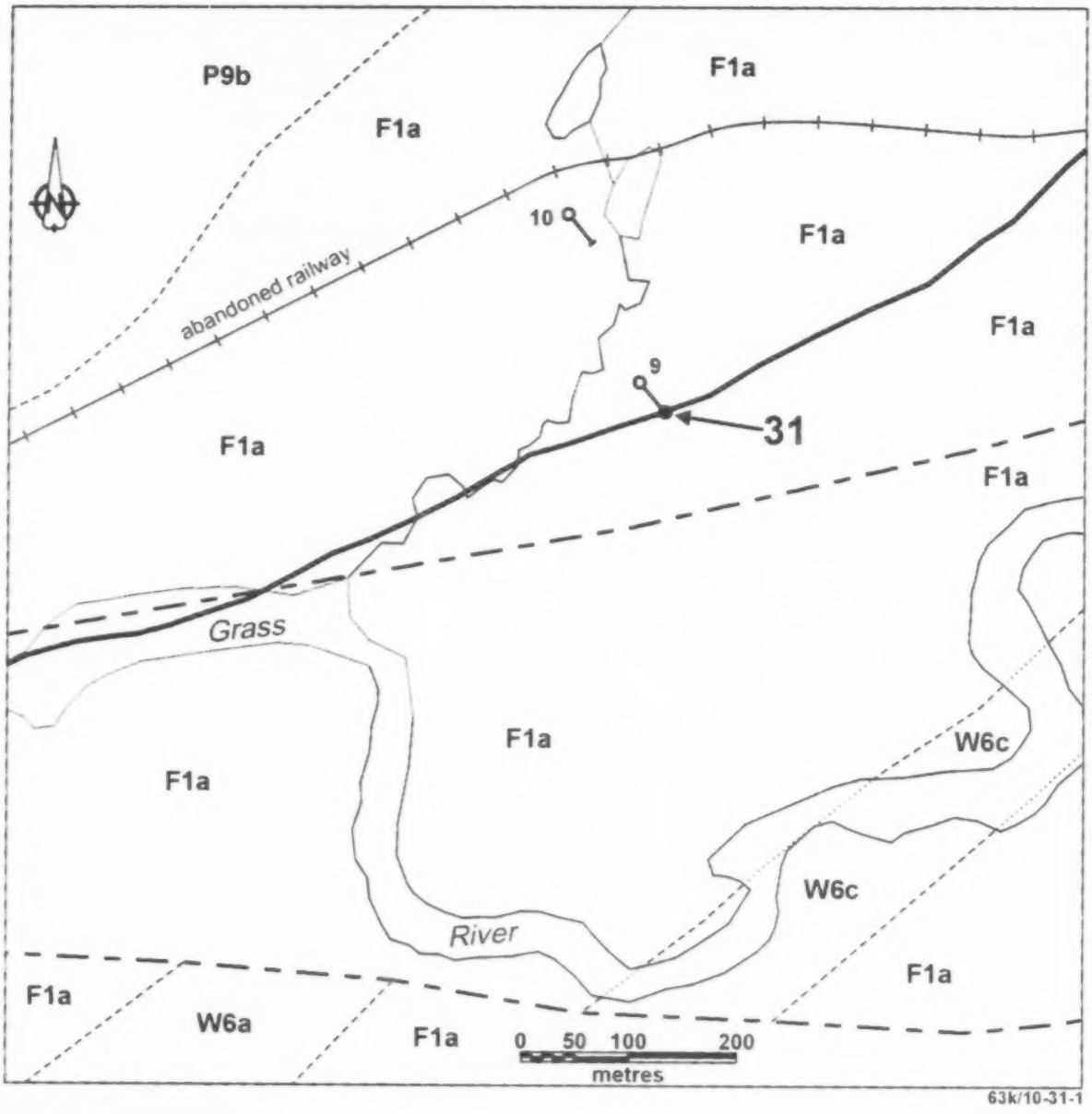
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1993: Cranberry-Simonhouse reconnaissance; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1993, p. 61-66.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- **W6a** — Mafic tectonite, phyllonite, mylonite
- **W6c** — Mafic phyllonite ± carbonate, cataclasite
- **P9b** — Granite to granodiorite
- **F1a** — McDougalls Point pillowed and massive basalt, diabase?
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group,1998
- EM conductor (A.F. 90282)
- Drillhole (A.F. 90503)
- • 31 Mineral occurrence location

Figure 31-1: Geological setting of Occurrence 31.

LOCATION: 32

NAME: mineralization intersected by diamond drilling
UTM: 371750 E 6065790 N
AREA: along NW shore at NE end of Third Cranberry Lake
ACCESS: via boat from Cranberry Portage on the Cranberry lakes
AIRPHOTO: A26327-186

EXPLORATION SUMMARY

Cyprus Exploration Corporation Limited performed an EM (Loop Frame system) and magnetometer survey over the area in 1955 (A.F. 90282). Several of the geophysical responses were drilled by Cyprus Exploration Corporation Limited in 1956 (A.F. 90503). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 32-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite, phyllonite and mylonite (unit W6a) of the Elbow Lake shear zone (Syme, 1993; 1994). This shear zone is developed in McDougalls Point pillowed basalt (unit F1a). The latter unit also contains synvolcanic diabase dykes and sills and massive flows, and lesser volcaniclastic and epiclastic metasediments. Athapapuskow pillowed and massive basalt (unit F2a) occurs in the NW part of the area.

The occurrence is located within the the Elbow Lake shear zone. DDH 8 intersected schistose graphitic mafic metavolcanic (?) rocks and quartz-feldspar gneiss (A.F. 90503). The gneiss is probably derived from a granitic intrusion.

MINERALIZATION

One 5 ft. (1.5 m) interval containing 4% pyrite and 10% graphite was intersected in hole 8. Graphite is a common accessory throughout much of the hole (A.F. 90503).

GEOCHEMICAL DATA

No assay results were reported for samples collected from drill core.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation (?). The rocks at this location have been strongly sheared and are graphitic, suggesting a biogenic component.

REFERENCES

A.F. 90282, 90503 and 91854; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1993: Cranberry-Simonhouse reconnaissance; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1993, p. 61-66.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

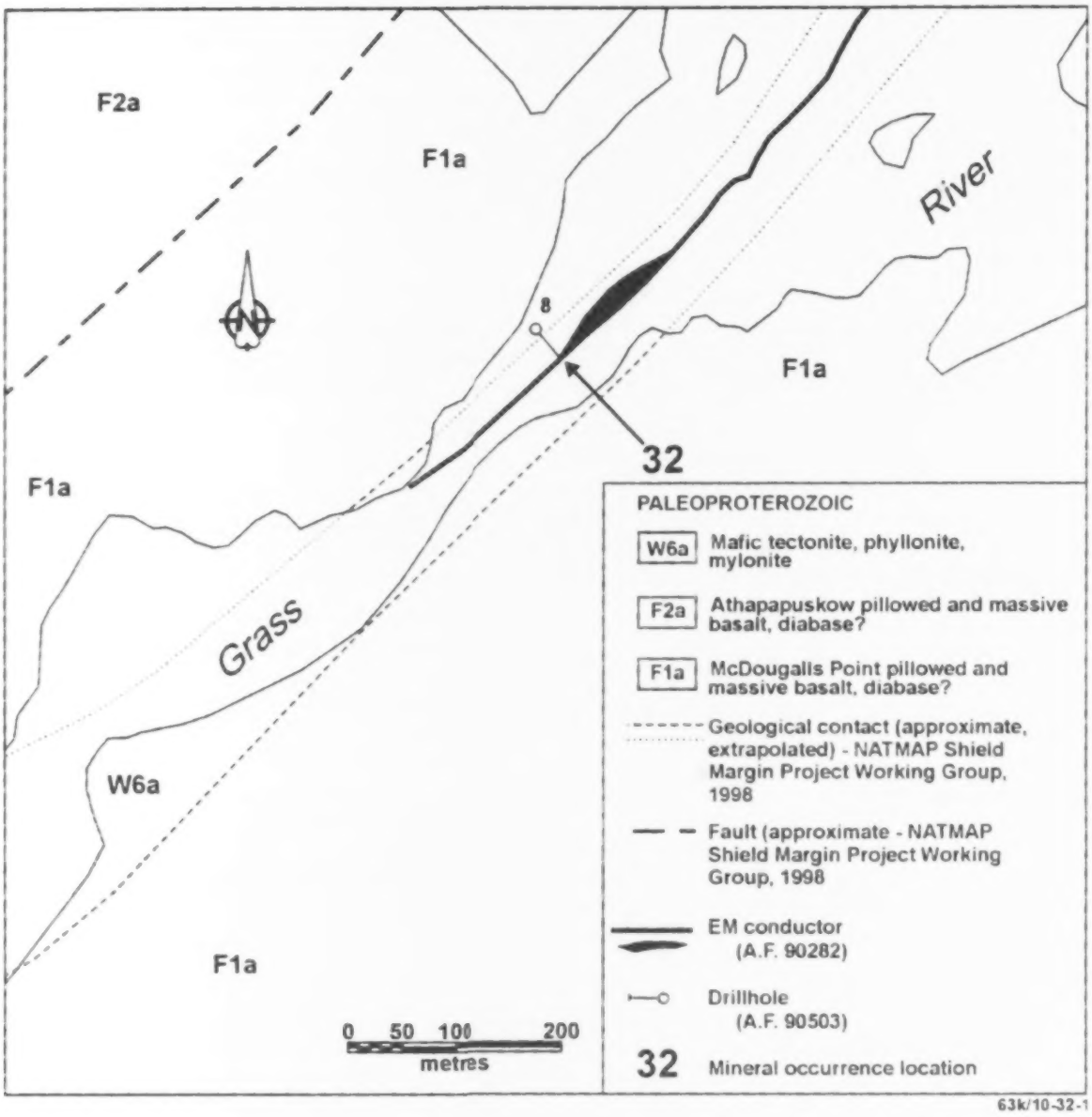


Figure 32-1: Geological setting of Occurrence 32.

LOCATION: 33

NAME: mineralization intersected by diamond drilling.
UTM: 400720 E, 6051990 N
AREA: on central part of Bartlett Point south of Fourmile Island, Reed Lake.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26325-26

EXPLORATION SUMMARY

In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279). Hudson Bay Exploration and Development Company, Limited performed an airborne EM and radiometric survey over the area in 1970 (A.F. 90281). Gränges Exploration AB undertook an HLEM survey over the area and drilled a geophysical target in 1981 (A.F. 93105).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 33-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by tholeiitic basalt, basaltic andesite, gabbro and derived amphibolite (unit J1a), and felsic tuff, lapilli tuff, breccia and heterolithologic breccia (unit J7a) (NATMAP Shield Margin Project Working Group (1998). Mafic phyllonite and cataclasite (unit W6c) of the Berry Creek fault is located north of the occurrence. Ordovician dolostone outcrops approximately 900 m ENE of the occurrence.

Hole RAD-5 intersected a sequence of mafic to intermediate metavolcanic rocks ("andesite" and "dacite") intercalated with quartz porphyry (A.F. 93105).

MINERALIZATION

Sulphides, in part as disseminations, occur both in the quartz porphyry and "dacite" in hole RAD-5, in the intervals summarized below (A.F. 93105):

Interval	Mineralization
144.0-145.0 ft. (43.9-44.2 m)	20% pyrite, in quartz porphyry
259.0-263.0 ft. (78.9-80.2 m)	30-35% pyrite, in "dacite"
263.0-265.0 ft. (80.2-80.8 m)	5-10% pyrite and pyrrhotite, in "dacite"
265.0-266.5 ft. (80.8-81.2 m)	minor pyrite, pyrrhotite, trace arsenopyrite, in "dacite"
271.6-272.5 ft. (82.8-83.1 m)	15% pyrite in quartz, in "dacite"
288.0-290.5 ft. (87.8-88.5 m)	30% pyrite, in "dacite"

GEOCHEMICAL DATA

The following assays were obtained from the sulphide-rich intervals in hole RAD-5 (A.F. 93105):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
143.0-145.0 ft. (43.6-44.2 m)	0.03	0.01	0.10	0.5
203.7-206.0 ft. (62.1-62.8 m)	—	—	0.05	0.5
218.0-219.0 ft. (66.4-66.8 m)	—	—	2.5	0.5
253.0-259.0 ft. (77.2-78.9 m)	—	—	0.05	0.5
259.0-263.0 ft. (78.9-80.2 m)	0.10	0.14	0.05	1.5
263.0-265.0 ft. (80.2-80.8 m)	—	—	0.05	0.5
265.0-266.5 ft. (80.8-81.2 m)	—	—	0.05	0.5
271.6-272.5 ft. (82.8-83.1 m)	0.01	0.04	0.05	0.5
288.0-290.5 ft. (87.8-88.5 m)	—	0.06	0.05	0.5

CLASSIFICATION

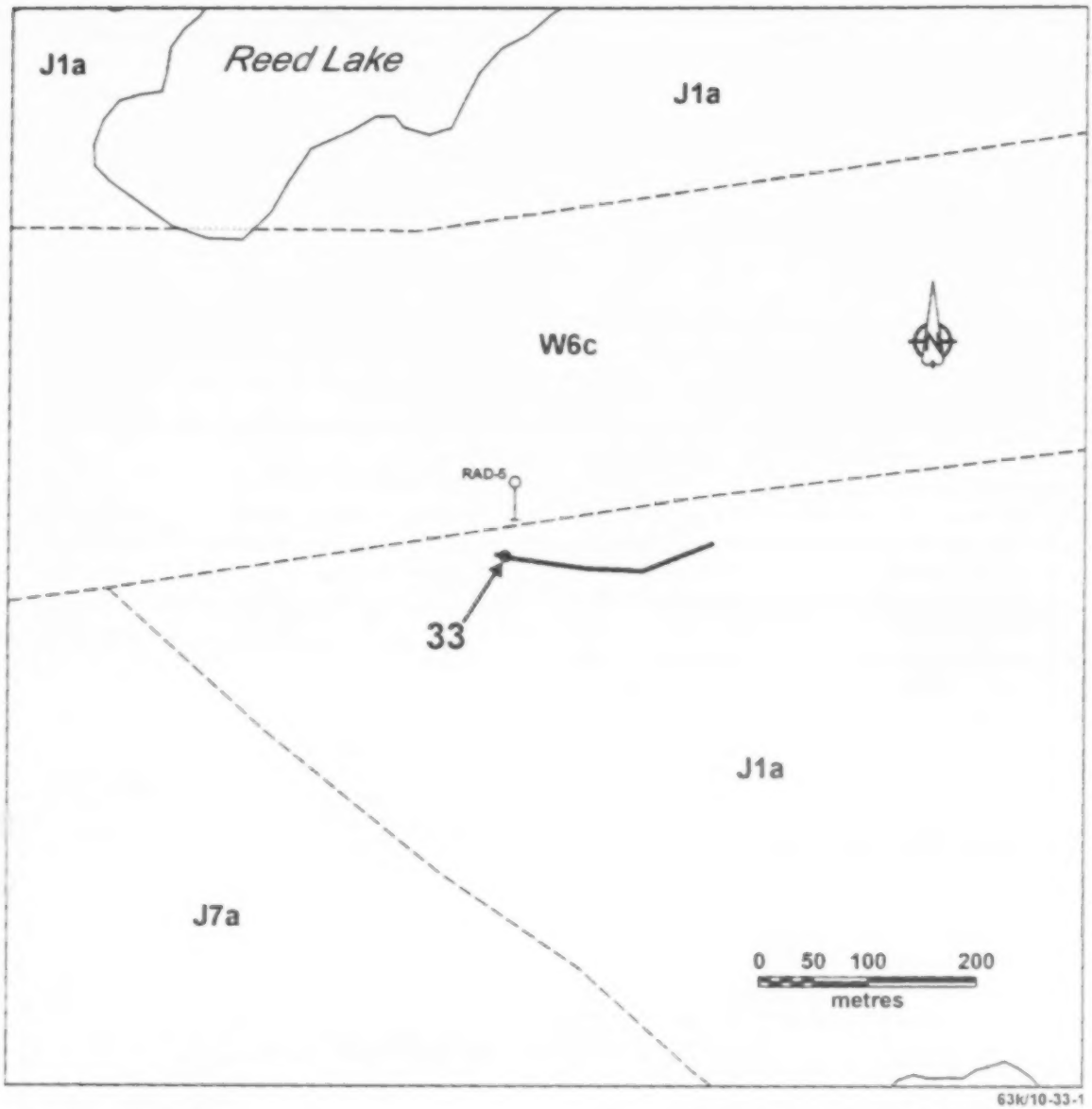
Vein type deposit; multiple veins or lenses (?).

REFERENCES

A.F. 90279, 90281, 91854 and 93105; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOPROTEROZOIC

W6c — Mafic phyllonite ± carbonate, cataclasite

J7a — Felsic tuff, lapilli tuff, breccia heterolithologic breccia

J1a — Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Goup, 1998

EM conductor (A.F. 93105)

Drillhole location (A.F. 93105)

33 Mineral occurrence location

Figure 33-1: Geological setting of Occurrence 33.

LOCATION: 34

NAME: mineralization intersected by diamond drilling
UTM: 383060 E 6057285 N
AREA: north side of Iskwasum Lake east of Barb Creek
ACCESS: via boat on Iskwasum Lake and traverse
AIRPHOTO: A26328-80

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). Kerr Addison Mines Limited performed an EM (Crone JEM) survey in 1964-65 (A.F. 90279) and drilled two holes in 1965 (A.F. 90280). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 34-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum mafic-ultramafic complex (Syme, 1994). Mafic tectonite, phyllonite and mylonite (unit W6a) of the East Iskwasum shear zone occur to the west of the occurrence, and are derived from rocks of the mafic-ultramafic complex. Pillowed and massive basalt, and diabase (unit F1b) of the Claw Bay basalt occur west of the Iskwasum complex.

MINERALIZATION

Hole 2 intersected a 34.0 ft. (10.4 m) interval that contains 5-60% disseminated pyrite and pyrrhotite in "serpentinite" (A.F. 90280).

GEOCHEMICAL DATA

No assay results were reported for samples collected from drill core.

CLASSIFICATION

Magmatogenic type deposit associated with mafic/ultramafic rocks; disseminated.

REFERENCES

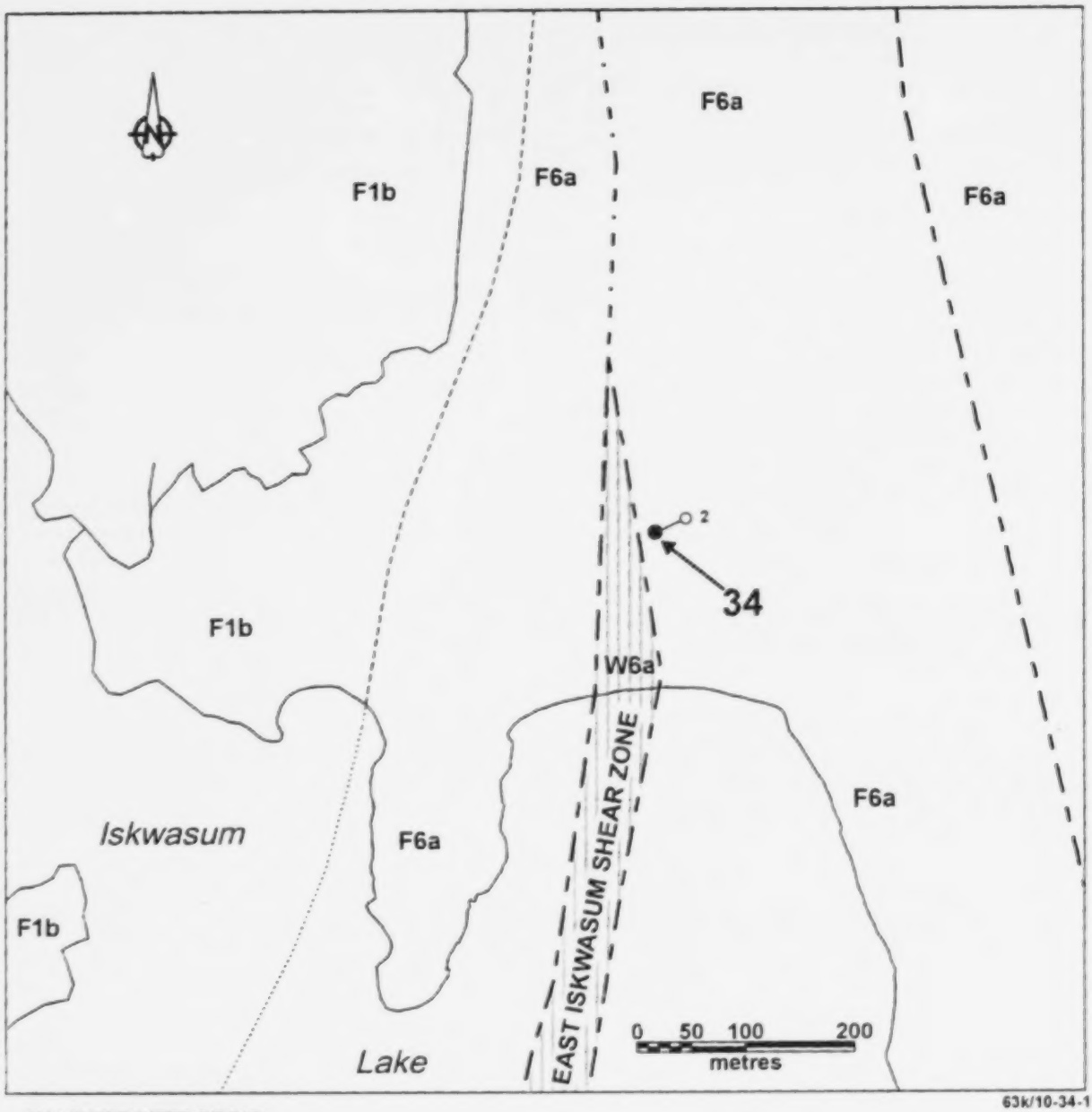
A.F. 90279, 90280, 91708, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- Shear Zone (approximate) - NATMAP Shield Margin Working Group, 1998
- Drillhole (A.F. 90280)
- 34 — Mineral occurrence location

Figure 34-1: Geological setting of Occurrence 34.

LOCATION: 35

NAME: mineralization intersected by diamond drilling
UTM: 381050 E 6055510 N
AREA: under Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26326-91

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). A magnetometer survey was undertaken by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90275), and several geophysical responses were drilled in 1967 (A.F. 90276). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 35-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, gabbro pegmatite and leucogabbro (unit F6a) and pyroxenite, peridotite and serpentinite (unit F6b) of the Iskwasum Lake mafic-ultramafic complex (Syme, 1994). Mafic tectonite, phyllonite and mylonite (unit W6a) of the Iskwasum Lake shear zone occur to the south of the occurrence.

The units intersected in hole LAW-44 comprise a sequence of ultramafic lithologies consisting of carbonate- and talc-rich intervals with lesser fine grained mafic units.

MINERALIZATION

Hole LAW-44 intersected several narrow intervals totaling 4.5 ft. (1.4 m) from 166.6-207.4 ft. (50.8-63.2 m) containing near solid pyrite associated with graphite.

GEOCHEMICAL DATA

No assay results were reported.

CLASSIFICATION

Chemical-sedimentary type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to parts of this sequence. Graphitic rocks have been sheared due to their proximity to the Iskwasum Lake shear zone.

REFERENCES

A.F. 90275, 90276, 91708, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P2f — Diabase, diabase dyke complex
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F6b — Pyroxenite, peridotite, serpentinite
- F1a — McDougalls Point pillowed and massive basalt, diabase?

- ..... Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- ——— EM conductor (A.F. 90275)
- ⊢○ Drillhole (A.F. 90276)
- 35 ● Mineral occurrence location

Figure 35-1: Geological setting of Occurrence 35

LOCATION: 36

NAME: mineralization intersected by diamond drilling
UTM: 383745 E 6053035 N
AREA: in southeastern part of Iskwasum Lake
ACCESS: via boat on Iskwasum Lake
AIRPHOTO: A26326-84

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). A magnetometer survey was undertaken by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90275), and several geophysical responses were drilled in 1967 (A.F. 90276). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 36-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite, phyllonite and mylonite (unit W6a) of the East Iskwasum and Iskwasum Lake shear zones (Syme, 1994). Gabbro, gabbro pegmatite and leucogabbro (unit F6a) of the Iskwasum Lake mafic-ultramafic complex occur to the south and north of the occurrence. Various granitic phases, including tonalite to quartz diorite (unit P6d), foliated and gneissic granodiorite to tonalite (unit P7e), xenolith-rich granodiorite (unit P7c) and granodiorite (unit P7a) of the Gants Lake batholith occur to the south and SE.

Hole LAW-58 intersected a sequence of schists and strongly foliated mafic lithologies (A.F. 90276).

MINERALIZATION

Hole LAW-58 intersected a 17.6 ft. (5.4 m) interval containing 10-20% pyrrhotite and 1-10% pyrite in a strongly foliated mafic (basaltic?) lithology (A.F. 90276).

GEOCHEMICAL DATA

No assay results were reported.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. Possible volcanic rock associated sulphides, strongly sheared

REFERENCES

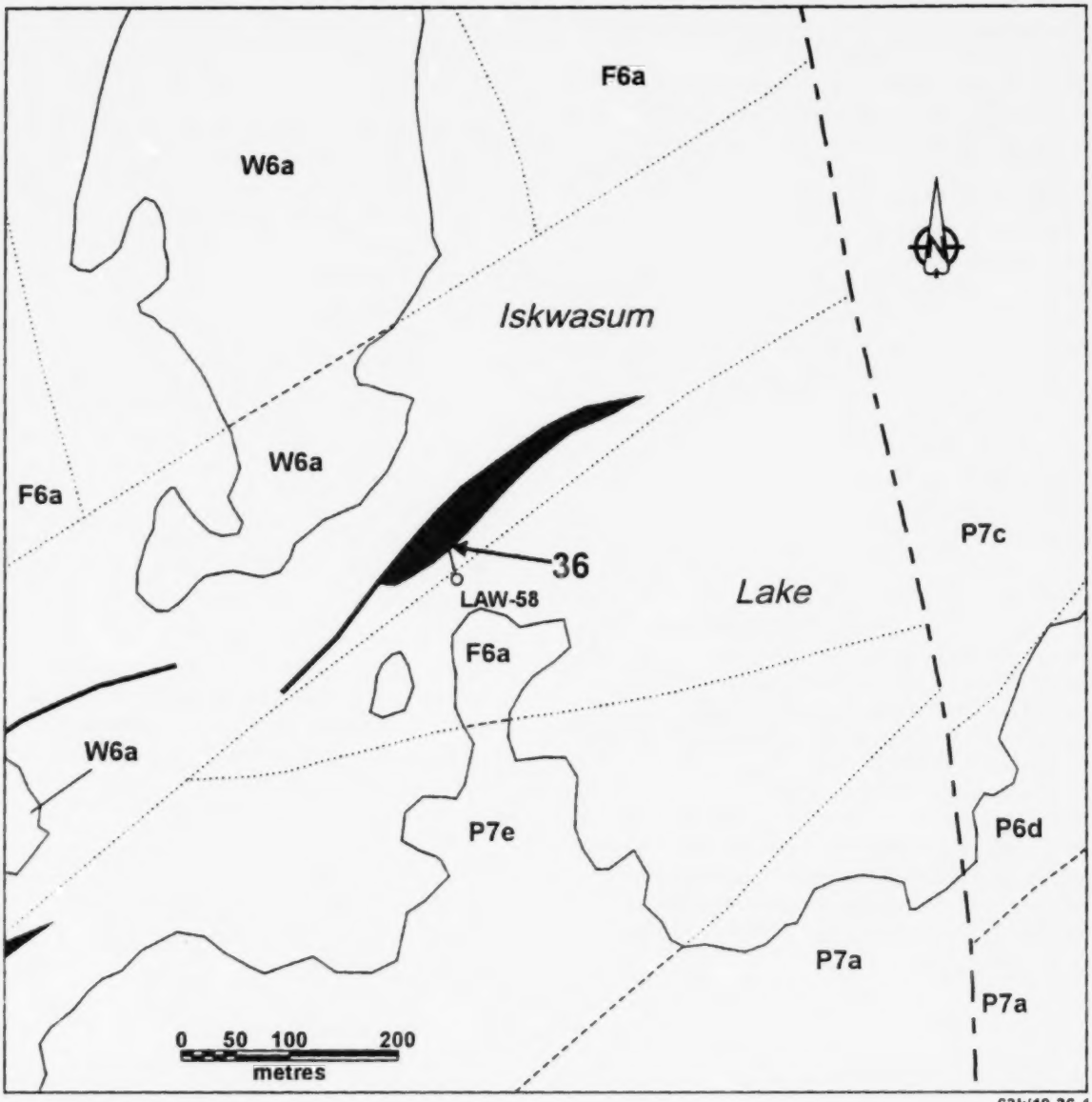
A.F. 90275, 90276, 91708, 91854 and 92472; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- **W6a** Mafic tectonite, phyllonite, mylonite
- **P7a** Granodiorite
- **P7c** Xenolith-rich granodiorite
- **P7e** Foliated and gneissic granodiorite to tonalite
- **P6d** Tonalite to quartz diorite
- **F6a** Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 90276)
- Drillhole (A.F. 90276)
- **36** Mineral occurrence location

Figure 36-1: Geological setting of Occurrence 36.

LOCATION: 37

NAME: mineralization intersected by diamond drilling
UTM: 401305 E 6067750 N
AREA: approximately 350 m east of N end of Krug Lake
ACCESS: via bush airplane to Krug Lake, then traverse
AIRPHOTO: MB90026-11

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619), and in 1957 several conductors that had been delineated by a ground geophysical survey were drilled (A.F. 90272). In 1969 another drillhole tested another part of the same (?) conductor (A.F. 90269).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 37-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by quartz ferrodiorite, ferrotonalite and leucotonalite (unit P3c), ferrogabbro (unit P3b), gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) and andesite and derived fine-grained garnetiferous amphibolite (unit J3a). The mafic sills are intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks.

Drillholes HEN-30, -31, -32, -33 and -34 intersected a sequence of gabbroic and metamorphosed mafic to felsic volcanic and volcaniclastic rocks. Rhyolitic intervals were intersected in holes HEN-30, -32, and -33 (A.F. 90272). Some of the rhyolite is described as being flow banded and showing intrusive relationships with the enclosing "andesite".

Hole EEL-5 appears to have been drilled on the same conductor as the HEN series, but its location is uncertain. It intersected a sequence consisting of fine grained, massive "andesite" with several siliceous and cherty intervals. Coarse grained, massive gabbro occurs at the bottom of the hole (A.F. 90269).

MINERALIZATION

Hole EEL-5 intersected sulphide mineralization hosted by fine grained "andesite" (A.F. 90269). The mineralized intervals intersected in the drillholes are summarized as follows:

Interval	Mineralization
hole HEN-30	
129.0-138.0 ft. (39.3-42.1 m)	well mineralized with pyrrhotite with tr chalcopyrite
140.8-191.2 ft. (42.9-58.3 m)	well mineralized with pyrrhotite with tr chalcopyrite
hole HEN-32	
107.0-119.4 ft. (32.6-36.4 m)	well mineralized with pyrrhotite with minor chalcopyrite
140.0-150.0 ft. (42.7-45.7 m)	slightly to well mineralized with pyrite and pyrrhotite
156.7-235.0 ft. (47.8-71.6 m)	slightly to well mineralized with pyrrhotite with minor chalcopyrite
hole HEN-33	
155.0-175.0 ft. (47.2-53.3 m)	well mineralized with pyrrhotite
hole EEL-5	
6.0-25.0 ft. (1.8-7.6 m)	well mineralized to solid pyrrhotite, minor pyrite

GEOCHEMICAL DATA

No assay results were reported.

CLASSIFICATION

Stratabound massive sulphide type deposit; volcanic rock associated.

REFERENCES

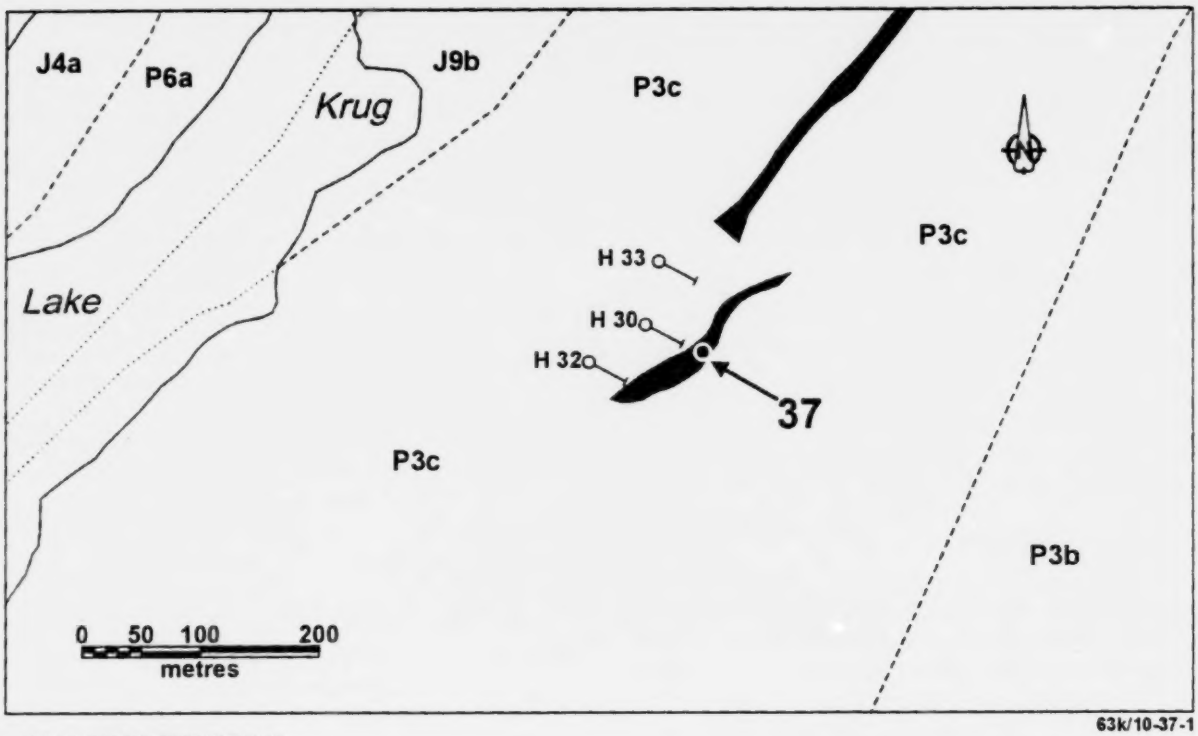
A.F. 90269, 90272 and 91619; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOPROTEROZOIC

- P6a Tonalite
- P3b Ferrogabbro
- P3c Quartz ferrodiorite, ferrotonalite, leucotonalite
- J9b Greywacke, siltstone, mudstone
- J4a Rhyolite to dacite flows, flow breccia

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 90272)
- Drillhole (A.F. 90269, 90272)
- 37 Mineral occurrence location

Figure 37-1: Geological setting of Occurrence 37.

LOCATION: 38

NAME: mineralization intersected by diamond drilling
UTM: 395395 E 6065290 N
AREA: approximately 2800 m SW of the south end of Rail Lake and 1000 m S of abandoned rail line.
ACCESS: by vehicle along abandoned CNR rail line from Chisel Lake, then traverse.
AIRPHOTO: MB90026-63

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). A hole was drilled in 1971 by Hudson Bay Exploration and Development Company, Limited to test an HLEM conductive response at the occurrence (A.F. 90262). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 38-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by tonalite (unit P6a), granodiorite (unit P7a) and xenolith-rich granodiorite (unit P7c) of the Little Swan Lake pluton (Morrison and Whalen, 1995). This intrusion is dominated by coarse grained hornblende-biotite granodiorite, and contains mafic zones up to 1500 m thick. Contact relationships between the mafic and granodioritic units suggest the presence of coexisting mafic and felsic magmas during the emplacement of this intrusion (Whalen, 1993).

Drillhole EEL-143 intersected weakly to moderately foliated biotite granodiorite with lesser foliated "andesite" and "dacite" (biotite gneiss) intervals (A.F. 90262).

MINERALIZATION

The character of the mineralization is not described in the lithologs. Mineralized intervals occur in light grey, fine to medium grained, foliated biotitic "dacite" in hole EEL-143 over the following intervals (A.F. 90262):

Interval	Mineralization
265.0-268.2 ft. (80.8-81.7 m)	75% pyrrhotite, 1% pyrite
270.5-271.3 ft. (82.4-82.7 m)	10% pyrrhotite, 2% pyrite
273.1-274.5 ft. (83.2-83.7 m)	60% pyrrhotite
276.2-277.8 ft. (84.2-84.7 m)	5% pyrrhotite
277.8-279.6 ft. (84.7-85.2 m)	75% pyrrhotite, tr sphalerite
282.1-283.3 ft. (86.0-86.3 m)	60% pyrrhotite, 5% pyrite, tr chalcopyrite, sphalerite
284.2-286.0 ft. (86.6-87.2 m)	30% pyrrhotite, 2% pyrite, tr chalcopyrite, sphalerite
288.0-289.4 ft. (87.8-88.2 m)	20% pyrrhotite
291.2-293.7 ft. (88.8-89.5 m)	60% pyrrhotite, 2% pyrite, tr chalcopyrite, sphalerite
304.2-305.0 ft. (92.7-93.0 m)	5% pyrrhotite

GEOCHEMICAL DATA

No assay results were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation (?). Possibly volcanic rock as xenoliths within granitic pluton.

REFERENCES

A.F. 90262, 90263, 91619 and 91661; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Morrison, D.W. and Whalen, J.B.

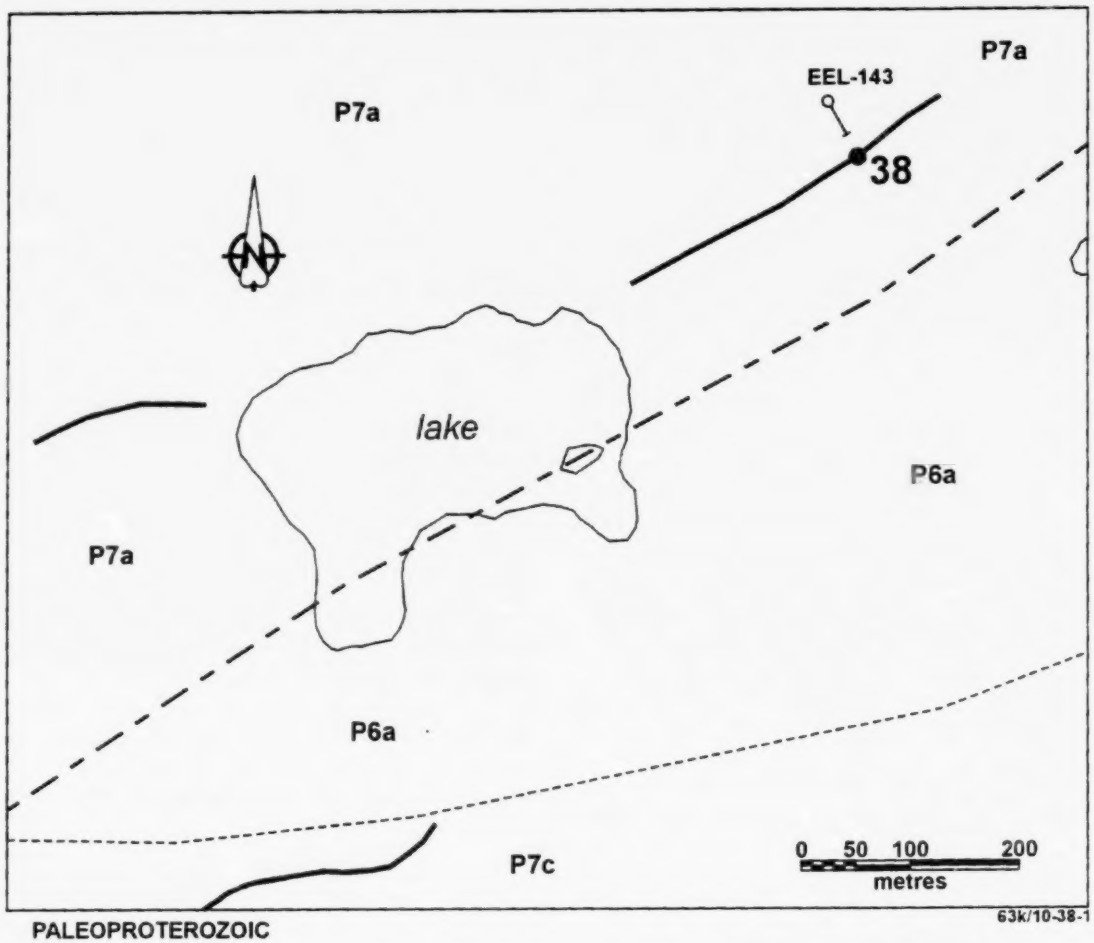
1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; **in** Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Whalen, J.B.

1993: Granitoid rocks of the Elbow Lake sheet (NTS 63K/15); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p. 86-89.



PALEOPROTEROZOIC

P7a Granodiorite

P7c Xenolith-rich granodiorite

P6a Tonalite

------ Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

— – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

——— EM conductor (A.F. 90262)

⊢○ Drillhole (A.F. 90262)

● 38 Mineral occurrence location

Figure 38-1: Geological setting of Occurrence 38.

LOCATION: 39

NAME: mineralization intersected by diamond drilling
UTM: 393575 E 6063795 N
AREA: approximately 2 km north of Radar Lake (unofficial name), 2500 m south of abanadoned CNR railway line.
ACCESS: by vehicle along abandoned rail line from Chisel Lake, then traverse, or by bush plane to Radar Lake and traverse.
AIRPHOTO: MB90026-64

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263), and two holes were drilled in 1979 to test the conductive response at the occurrence (A.F. 92693).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 39-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by granodiorite (unit P7a), xenolith-rich granodiorite (unit P7c), and tonalite (unit P6a) of the Gants Lake batholith. The occurrence is located near a NNE trending fault within moderately foliated plagioclase-porphyritic hornblende-biotite granodiorite (Morrison and Whalen, 1995) The rocks are on strike with the NNE-trending Flag Lake shear zone, and mylonitic felsic intrusive rocks are present in the area, but it is unclear if these foliated units are related to the shear zone or to a separate fault bounded block. The Little Swan Lake Pluton occurs approximately 1 km north of the occurrence.

The lithologic descriptions for the core indicate that the mineralization occurs in a sequence of fine to medium grained quartz-feldspar-biotite±hornblende±garnet gneisses (A.F. 92693).

MINERALIZATION

The character of the mineralization is not well described in the drillhole lithologs. Sulphide mineralization occurs over the following intervals (A.F. 92693):

Interval	Mineralization
hole EEL-288	
138.5-141.0 ft. (42.2-43.0 m)	5% pyrrhotite, 1-2% pyrite, 2% chalcopyrite
141.0-142.5 ft. (43.0-43.4 m)	70% pyrrhotite, 7% pyrite, 5% chalcopyrite
142.5-143.8 ft. (43.4-43.8 m)	70% pyrrhotite, 5% pyrite, 12% chalcopyrite
143.8-146.5 ft. (43.8-44.7 m)	70% pyrrhotite, 5% pyrite, 4% chalcopyrite
146.5-149.0 ft. (44.7-45.4 m)	1% pyrrhotite, 1% pyrite, tr chalcopyrite
151.0-152.2 ft. (46.0-46.4 m)	1% pyrrhotite, 1% pyrite, 4% chalcopyrite
hole EEL-289	
119.0-124.0 ft. (36.3-37.8 m)	30% pyrrhotite, 10% pyrite, tr-2% chalcopyrite
124.0-127.0 ft. (37.8-38.7 m)	5% pyrrhotite, 5% pyrite, tr chalcopyrite
134.0-144.0 ft. (40.8-43.9 m)	30% pyrrhotite, 10% pyrite, tr-2% chalcopyrite
144.0-147.0 ft. (43.9-44.8 m)	5% pyrrhotite, 5% pyrite, tr chalcopyrite

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals (A.F. 92693):

Interval	%Cu	%Zn
hole EEL-288		
133.6-137.0 ft. (40.7-41.8 m)	0.26	<0.1
138.5-149.0 ft. (42.2-45.4 m)	0.29	
151.0-152.2 ft. (46.0-46.4 m)	0.25	
hole EEL-289		
119.0-124.0 ft. (36.3-37.8 m)	0.21	0.1
134.0-144.0 ft. (40.8-43.9 m)	0.23	0.1

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation (?). Possibly volcanic rock as xenoliths or screens within granitic pluton.

REFERENCES

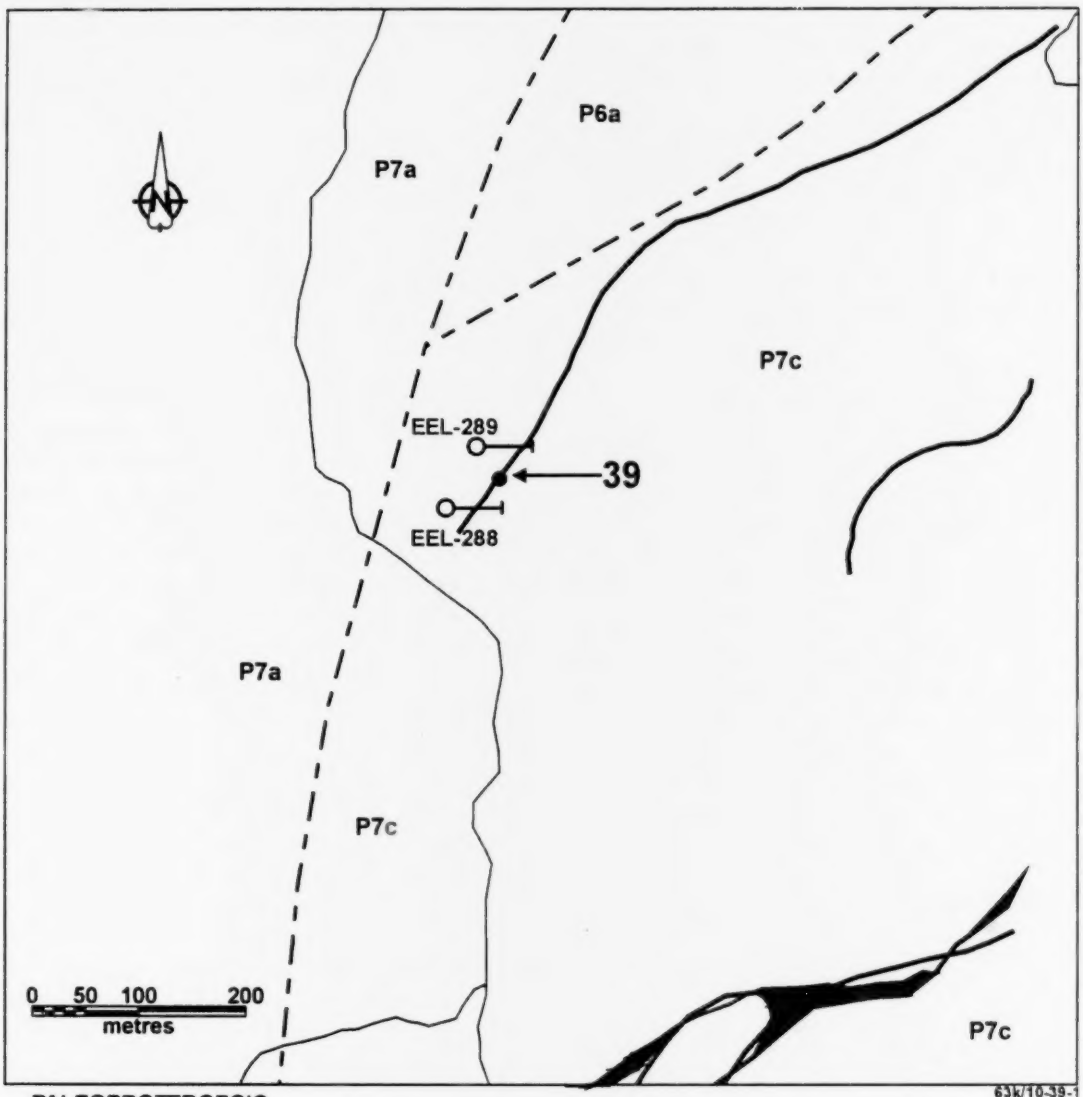
A.F. 90263, 91619, 91661 and 92693; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; in Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOPROTEROZOIC

P7a Granodiorite

P7c Xenolith-rich granodiorite

P6a Tonalite

Fault (approximate)- NATMAP Shiels Margin Project Working Group, 1998

EM conductor (A.F. 90263)

Drillhole (A.F. 92693)

39 Mineral occurrence location

Figure 39-1: Geological setting of Occurrence 39.

LOCATION: 40

NAME: mineralization intersected by diamond drilling
UTM: 393565 E 6062955 N
AREA: under small lake approximately 1.3 km north of Radar Lake (unofficial name).
ACCESS: by vehicle along abandoned rail line from Chisel Lake, then traverse, or by bush plane to Radar Lake and traverse.
AIRPHOTO: A26325-183

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 40-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b). These rocks are on strike with the NNE-trending Flag Lake shear zone along the eastern margin of the Gants Lake batholith (*Syme et al.*, 1995a, b). Granodiorite (unit P7a) and xenolith-rich granodiorite (unit P7c) of the Gants Lake batholith occur to the west and north, respectively, of the occurrence. The Little Swan Lake pluton (Morrison and Whalen, 1995) is located approximately 1.7 km north of the occurrence.

The rocks at the occurrence consist of granodiorite intrusion breccia and mafic to felsic tectonites. The host lithology for the mineralization is described as hornblende-plagioclase gneiss. Hornblende-plagioclase-garnet gneiss and a fine grained, black, massive mafic unit are also present (A.F. 90250).

MINERALIZATION

Several thin mineralized intervals containing pyrrhotite and pyrite were intersected by drillhole HEN-57 as follows (A.F. 90250):

Interval	Mineralization
189.0-190.2 ft. (57.6-58.0 m)	well mineralized with pyrrhotite
192.4-193.4 ft. (58.6-58.9 m)	moderately mineralized with pyrrhotite
194.0-195.0 ft. (59.1-59.4 m)	well mineralized with pyrrhotite, slight pyrite
198.4-199.0 ft. (60.5-60.7 m)	well mineralized with pyrite
202.0-206.5 ft. (61.6-62.9 m)	well mineralized with pyrrhotite, pyrite
308.8-312.6 ft. (94.1-95.3 m)	moderately to well mineralized with pyrrhotite, pyrite
368.2-374.9 ft. (112.2-114.3 m)	moderately to well mineralized with pyrrhotite

GEOCHEMICAL DATA

No assay results were reported for the mineralized intervals.

CLASSIFICATION

Chemical-sedimentary type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 90263, 91619 and 91661; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; **in** Current Research 1995-C, Geological Survey of Canada, p. 225-234.

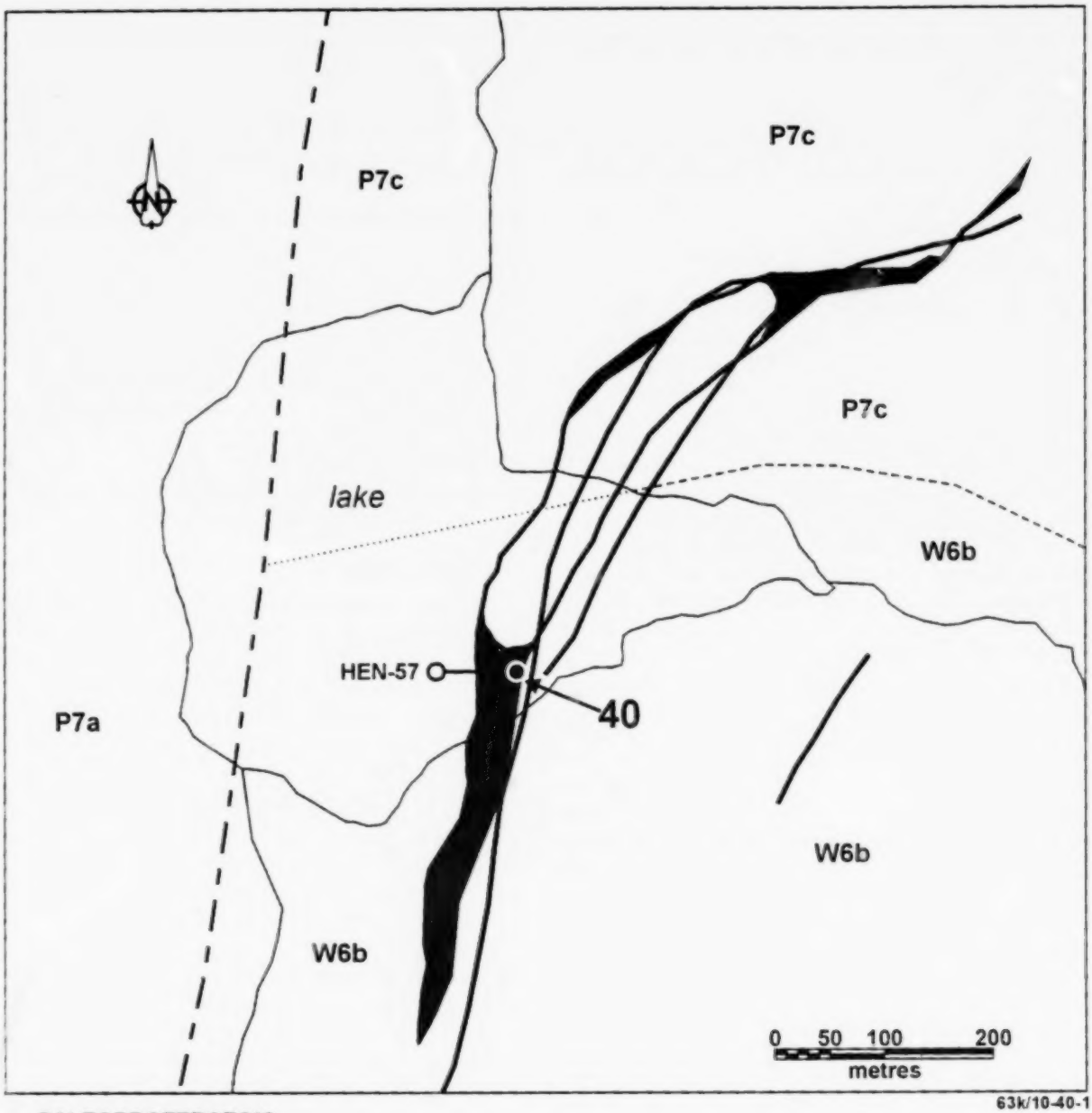
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, scale 1:50 000.



PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

P7a Granodiorite

P7c Xenolith-rich granodiorite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250)

Drillhole (A.F. 90250)

40 Mineral occurrence location

Figure 40-1: Geological setting of Occurrence 40.

LOCATION: 41

NAME: mineralization intersected by diamond drilling
UTM: 393365 E 6062360 N
AREA: approximately 700 m NW of north end of Radar Lake (unofficial name).
ACCESS: by bush plane to Radar Lake, then traverse.
AIRPHOTO: A26325-183

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 41-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b). These rocks are on strike with the NNE-trending Flag Lake shear zone along the eastern margin of the Gants Lake batholith and are probably related to this strand of the West Reed-North Star shear zone (Syme *et al.*, 1995a, b). Granodiorite (unit P7a) of the Gants Lake pluton occurs to the south and west of the occurrence. The Little Swan Lake pluton (Morrison and Whalen, 1995) occurs approximately 2.2 km north of the occurrence.

The mineralization is hosted by a banded, sericitic, siliceous, felsic rock described as "cherty quartz" in the drillhole litholog. This probably represents one of the mylonitic felsic units that are part of the mafic tectonite. The sequence intersected in the drillhole also consists of mafic lithologies ("andesite" and "amphibolite") as well as hornblende-quartz and hornblende-biotite-quartz schist and gneiss (A.F. 90250).

MINERALIZATION

The character of the mineralization was not described in the drillhole lithologs. Three thin mineralized intervals containing pyrite and pyrrhotite were intersected in hole HEN-61, as follows (A.F. 90250):

Interval	Mineralization
171.9-172.3 ft. (52.4-52.5 m)	near solid pyrite, pyrrhotite
177.5-178.8 ft. (54.1-54.5 m)	near solid pyrite, pyrrhotite
193.2-194.0 ft. (58.9-59.1 m)	solid pyrite

GEOCHEMICAL DATA

No assays were reported for the mineralized intervals.

CLASSIFICATION

Chemical-sedimentary type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 90263, 91619 and 91661; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; in Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995a: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Geological Services, Report of Activities 1995, p. 42-60.

1995b: Reed Lake (Parts of 63K/9 and 63K/10); Manitoba Energy and Mines, Preliminary Map 1995-F1, 1:50 000 scale.

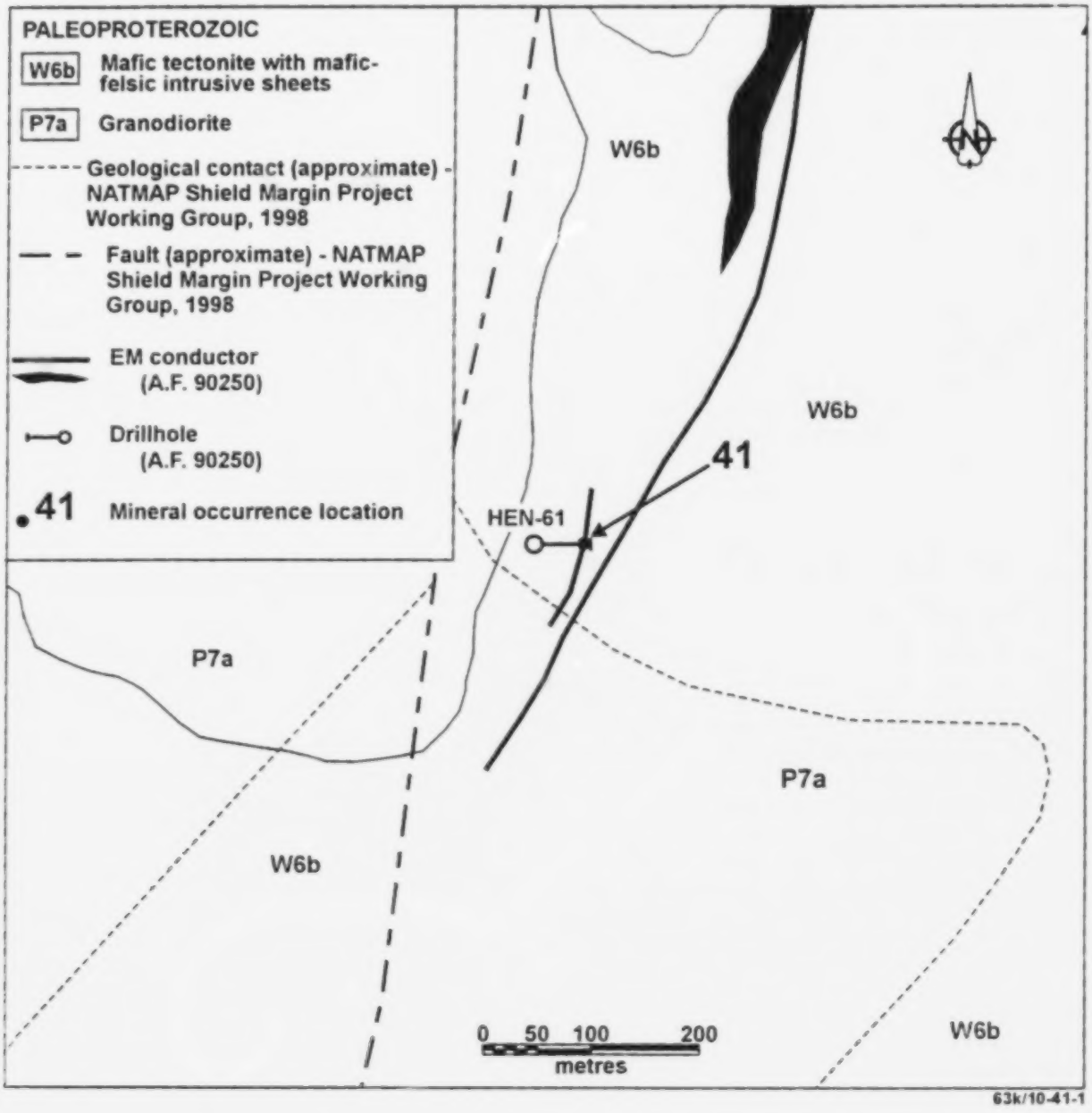


Figure 41-1: Geological setting of Occurrence 41.

LOCATION: 42

NAME: Iskwasum Lake talc occurrences
UTM: Site 1. 375265 E, 6062845 N
Site 2. 375255 E, 6062750 N
Site 3. 375210 E, 6062610 N
Site 4. 376025 E, 6062115 N
Site 5. 380990 E, 6056355 N
Site 6. 381655 E, 6056055 N
Site 7. 382445 E, 6054775 N
AREA: on islands in Iskwasum Lake and along shoreline of Grass River NW of Iskwasum Lake.
ACCESS: via boat on Iskwasum Lake and along Grass River
AIRPHOTO: Site 1 A26398-190
Site 2 A26398-190
Site 3 A26398-190
Site 4 A26398-190
Site 5 A26326-92
Site 6 A26326-92
Site 7 A26326-82

EXPLORATION SUMMARY

A magnetometer survey was conducted by Hudson Bay Exploration and Development Company, Limited in 1964-65 (A.F. 90277). A ground EM survey performed by Hudson Bay Exploration and Development Company, Limited prior to March 1967 covered Site 5 (A.F. 90276). Falconbridge Nickel Mines Limited had an airborne magnetic and EM survey flown over the Iskwasum Lake area in 1974 (A.F. 91564). Several talc occurrences were identified by Hunt (1970) in the Iskwasum Lake area, and Gunter and Yamada (1986) and Gunter (1988) have carried out examinations of several areas. In 1988 Esso Minerals Canada undertook a program that consisted of 1:5000 scale geological mapping, rock and humus geochemical sampling, and VLF-EM geophysical surveys over Sites 1, 2 and 3 (A.F. 93083).

None of these occurrences have been commercially evaluated and thus they have been grouped under a single heading. Four occurrences were examined in detail in 1994.

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting maps (Fig. 42-1 and -2) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). A belt of ultramafic rocks, comprising the Iskwasum Lake mafic-ultramafic complex (units F6a and F6b), extends along the eastern side of the Elbow Lake shear zone, and extends south from Barb Lake, through the central portion of Iskwasum Lake and along the east side of the Grass River NNW of Iskwasum Lake. A thin discontinuous band of mafic-ultramafic rocks extends NE along the Grass River extension of the Elbow Lake shear zone. This mafic-ultramafic complex is correlative with mafic complexes at Elbow and Claw lakes (Syme, 1991, 1992), and is associated with the Centre Lake mafic tectonite (Syme, 1994). Dates from this apparently stratiform intrusion indicate that it is contemporaneous with the Amisk volcanic rocks of the area (R. Stern, unpub. data).

MINERALIZATION

The talc occurs as fine-grained talcose areas and as discrete coarse grained talc veins that cut serpentinite.

Site 1 (Fig. 42-1) was investigated by Gunter (1988), who mapped a 30 x 50 m area in detail to better determine relationships among the lithologies at this exposure. Talc is the main mineralogical phase in the rock at this occurrence, but dolomite, magnesite, serpentine and Mg-chlorite were also identified.

At Site 2 (Fig. 42-1), talc-carbonate rock occurs in 3 m high outcrops along the shoreline of the Grass River. The rock is soft with local ill-defined harder and less talcose intervals. Carbonate is an ubiquitous constituent as brown-weathering euhedral to subhedral grains up to 3 mm. Most of the rock in the exposure contains 5-10% fine grained magnetite with grains up to 1 mm.

The northern part of the small island at Site 3 (Fig. 42-1) exposes polymictic conglomerate. It is separated from a small islet to the west by a low-lying wet area, where talc-carbonate rock similar to that at Site 2 is exposed in the north part of the islet.

Site 4 (Fig. 42-1) is located on two small islands approximately 1000 m SE of Site 2. It shows similar characteristics as Site 2.

The rocks at Site 5 (Fig. 42-2) are dominated by serpentinite with subordinate talcose areas up to 1.5 m thick. Talc-rich veins and patches occur in serpentinite, and in one exposure along the north shore of the island, rounded fragments of serpentinite are hosted by a talcose matrix.

Site 6 (Fig. 42-2) contains up to 70% talc with common hematitic patches to 1 mm. It is fine grained, massive and contains disseminated magnetite. To the north and northeast, the talc content of the rock decreases substantially, and the original texture of the ultramafic lithology is evident. The distribution of talc-rich areas on this island is unclear, but in one exposure a talc band containing a quartz vein is in sharp contact with talcose serpentinite.

Site 7 (Fig. 42-2) is the best one examined during the 1994 field program as it has the highest proportion of talc relative to serpentinite. The southern half of the exposure on this small island weathers white and contains areas of massive talc. Cross-cutting fractures are filled with coarse grained pale green talc. Brown-weathering carbonate as discrete euhedral to subhedral grains to 3 mm constitutes up to 30% of the talcose rock. Fine grained magnetite is disseminated throughout. Rare blocks of less-altered mafic rock are locally present within the talc-rich unit. Boudinaged carbonate layers are also present.

Additional talc occurrences not examined during this investigation have been indicated by Hunt (1970).

GEOCHEMICAL DATA

The following talc analyses were obtained from samples collected at Site 1 (R. Gunter, pers. comm. 1994):

Sample No.	% talc (weight loss method)	% talc (X-ray analysis)
ISK 3-1	55.06	42
ISK 3-2	46.34	49
ISK 3-3	57.12	54
ISK 3-4	62.63	56
ISK 3-5	50.44	48
ISK 3-6	45.43	48
ISK 3-7	4.83	0
ISK 3-8	56.92	48
ISK 3-9	44.21	45
ISK 3-10	54.78	41
ISK 3-11	46.65	43

An additional sample from one of the localities returned 55.5% talc, 42.5% dolomite and 1.5% magnesite (J. Bamburak, pers. comm. 1996).

CLASSIFICATION

Replacement-type deposit. Talc rich areas and veins in mafic/ultramafic rocks.

REFERENCES

A.F. 90276, 90277, 91564 and 93083; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Gunter, W.R.

1988: Industrial mineral occurrences in the Flin Flon and Thompson areas; **in** Manitoba Energy and Mines, Geologic Services, Report of Field Activities 1988, p. 96-102.

Gunter, W.R. and Yamada, P.H.

1986: Evaluation of industrial mineral occurrences in the Flin Flon-Snow Lake area; **in** Manitoba Energy and Mines, Geologic Services, Report of Field Activities 1986, p. 86-91.

Hunt, G.H.

1970: Geology of the Iskwasum Lake Area (West Half); Department of Mines and Natural Resources, Geological Survey of Manitoba, Mines Branch Publication 65-3, 40 p.

NATMAP Shield Margin Project Working Group

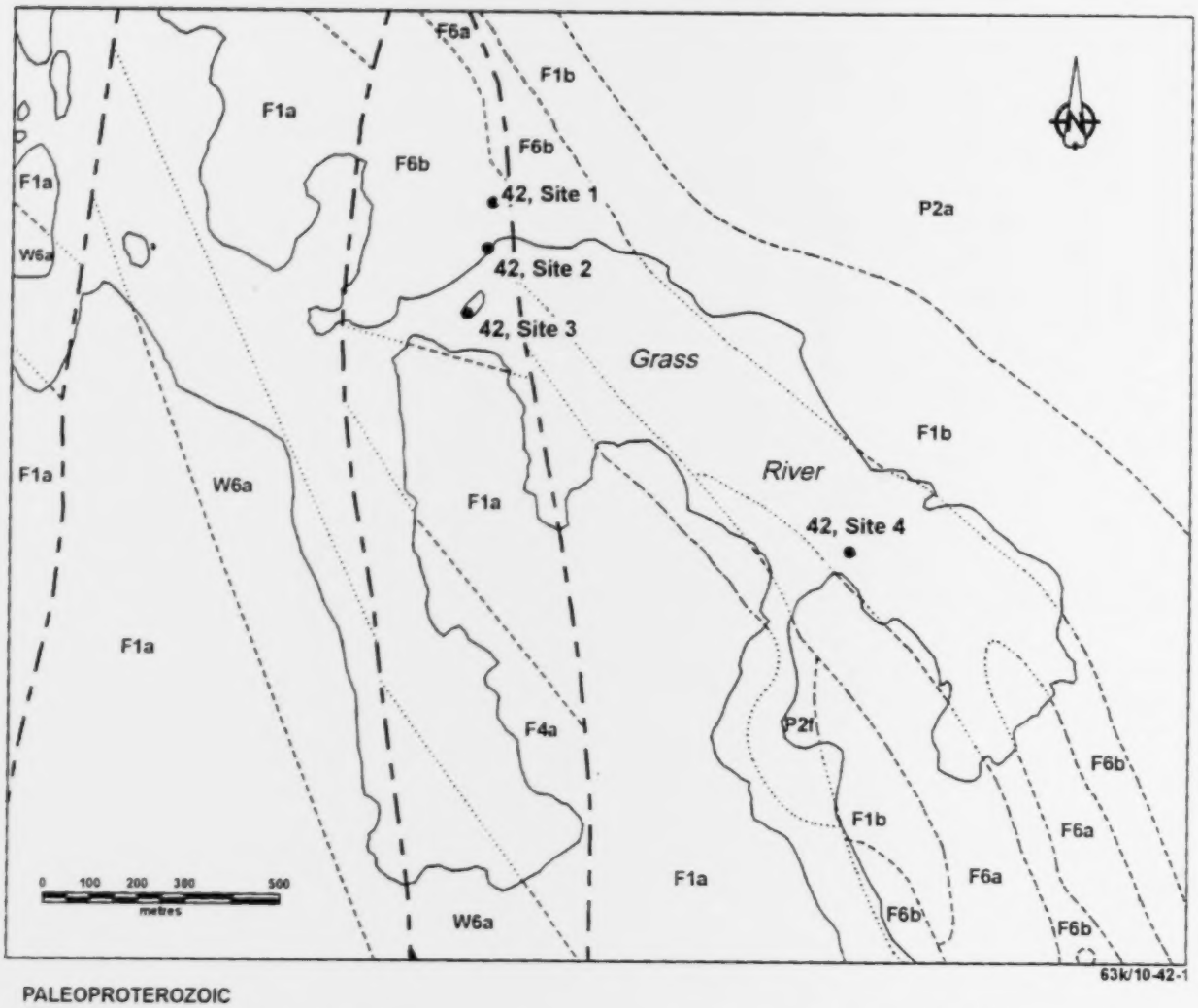
1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1991: Elbow Lake project - Part A: supracrustal rocks and structural setting; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities, 1991 p.14-27.

1992: Elbow Lake Project - Part A: Supracrustal rocks; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities, 1992, p.32-46.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

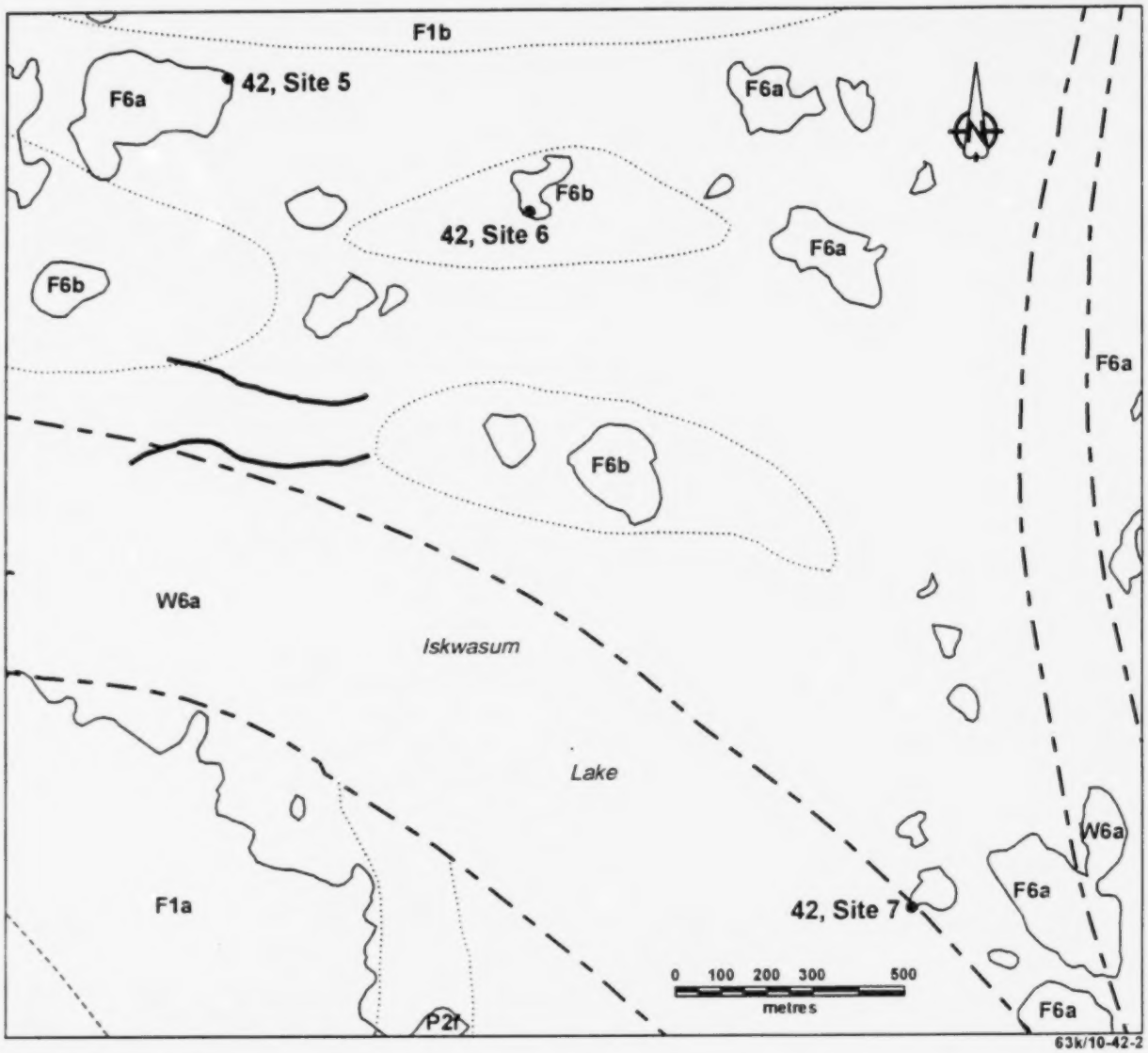


PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P2a — Gabbro, diorite
- P2f — Diabase, diabase dyke complex
- F1a — McDougalls Point pillowed and massive basalt, diabase?
- F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite
- F4a — Mafic volcaniclastic rocks: hyaloclastite, reworked hyaloclastite, mafic wacke
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F6b — Pyroxenite, peridotite, serpentinite

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group,1998
- 42, Site 3 • Mineral occurrence location

Figure 42-1: Geological setting of Sites 1, 2, 3 and 4, Occurrence 42.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P2f — Diabase, diabase dyke complex
- F1a — McDougalls Point pillowed and massive basalt, diabase?
- F1b — Claw Bay pillowed and massive basalt, diabase, derived tectonite
- F6a — Gabbro, gabbro pegmatite, leucogabbro, whispy-layered gabbro
- F6b — Pyroxenite, peridotite, serpentinite

- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 90276)
- 42, Site 5 ● Mineral occurrence location

Figure 42-2: Geological setting of Sites 5, 6 and 7, Occurrence 42.

LOCATION: 43

NAME: mineralization intersected by diamond drilling.
UTM: 399675 E 6063865 N
AREA: under Krug Lake approximately 2.7 km south of the railway bridge.
ACCESS: by vehicle along abandoned rail line from Chisel Lake and boat, or via bush aircraft.
AIRPHOTO: A26365-204

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352), who drilled several ground EM conductors in the area in 1975 (A.F. 92351).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 43-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Quartz ferrodiorite, ferrotonalite and leucotonalite (unit P3c), ferrogabbro (unit P3b), gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the east of the occurrence.

Drillhole KR-75-5 intersected weakly to moderately well foliated, grey to pale green, mafic metavolcanic rock, probably basalt, with interlayered fragmental intervals.

MINERALIZATION

Drillhole KR-75-5 intersected several thin mineralized zones over the following intervals (A.F. 92351):

Interval	Mineralization
99.5-100.0 ft. (30.3-30.5 m)	60-70% pyrite
110.7-111.6 ft. (33.7-34.0 m)	60-70% pyrite
137.4-139.8 ft. (41.9-42.6 m)	25% pyrrhotite, 20% pyrite
142.6-145.2 ft. (43.5-44.3 m)	30-40% pyrite
156.6-161.3 ft. (47.7-49.2 m)	5-30% pyrite, 10-15% pyrrhotite

GEOCHEMICAL DATA

The following assays were returned from the mineralized intervals sampled in hole KR-75-5 (A.F. 92351):

Interval	%Cu	%Zn	%Ni
99.0-100.0 ft. (30.2-30.5 m)	0.06	0.09	
101.6-110.7 ft. (31.0-33.7 m)	0.09	0.05	
110.7-111.7 ft. (33.7-34.0 m)	0.08	0.27	0.03
137.4-139.8 ft. (41.9-42.6 m)	0.11	0.32	
142.6-145.2 ft. (43.5-44.3 m)	0.03	0.14	
156.6-157.6 ft. (47.7-48.0 m)	0.04	0.08	
157.6-161.6 ft. (48.0-49.3 m)	tr	0.03	

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

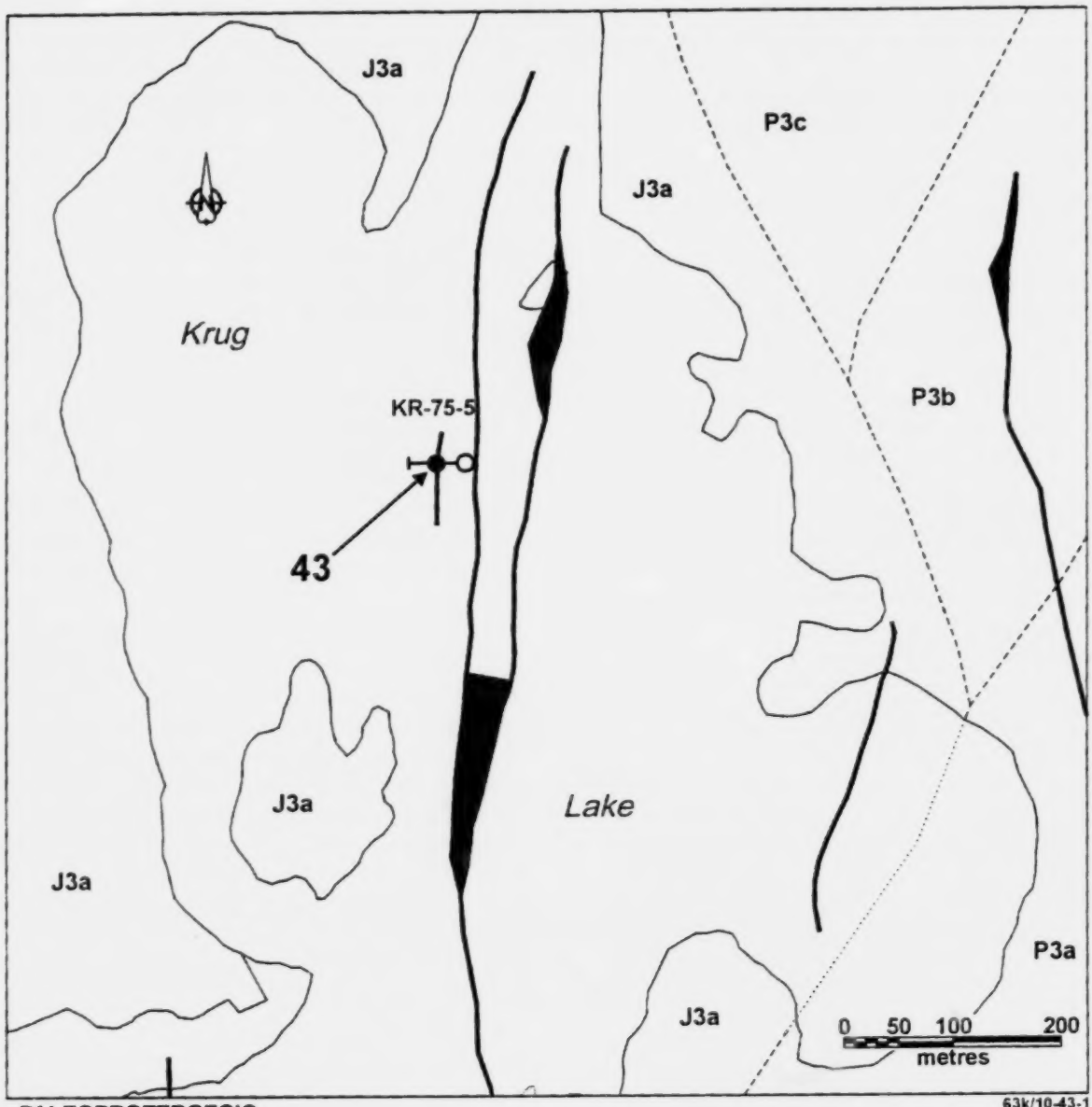
A.F. 91619, 92351 and 92352; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOPROTEROZOIC

- P3a Gabbronorite, gabbro
- P3b Ferrogabbro
- P3c Quartz ferrodiorite, ferrotonalite, leucotonalite
- J3a Andesite; derived fine-grained garnetiferous amphibolite

------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92351)

Drillhole (A.F. 92351)

43 ● Mineral occurrence location

Figure 43-1: Geological setting of Occurrence 43.

LOCATION: 44

NAME: mineralization intersected by diamond drilling
UTM: 399745 E 6063135 N
AREA: on east side of Krug Lake approximately 3.4 km south of the railway bridge
ACCESS: by vehicle along abandoned rail line from Chisel Lake and boat, or via bush aircraft
AIRPHOTO: A26325-204

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352), who drilled several ground EM conductors in the area in 1975 (A.F. 92351).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 44-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the east of the occurrence.

Drillhole KR-75-4 intersected moderately to strongly foliated, grey to pale green, mafic feldspar phyric metavolcanic rock, probably basalt, with rare fragmental intervals (A.F. 92351).

MINERALIZATION

Drillhole KR-75-4 intersected several thin mineralized zones over the following intervals (A.F. 92351):

Interval	Mineralization
75.0-77.8 ft. (22.9-23.7 m)	10-60% pyrite, 1-3% pyrrhotite, to 5% graphite
78.5-80.5 ft. (23.9-24.5 m)	10% pyrite, 10% pyrrhotite
84.4-86.3 ft. (25.7-26.3 m)	10-15% pyrite, 10% pyrrhotite
88.0-107.2 ft. (26.8-32.7 m)	3-20% pyrite, to 90% pyrrhotite, to 50% graphite
112.3-114.3 ft. (34.2-34.8 m)	30% pyrrhotite

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals sampled in hole KR-75-4 (A.F. 92351):

Interval	%Cu	%Zn	%Ni
75.0-77.8 ft. (22.9-23.7 m)	0.04	0.03	0.02
78.5-80.5 ft. (23.9-24.5 m)	0.03		tr
84.4-88.7 ft. (25.7-27.0 m)	0.02	0.08	tr
101.8-105.8 ft. (31.0-32.2 m)	0.06	0.12	tr
105.8-107.2 ft. (32.2-32.7 m)	0.16	0.74	0.06
112.3-114.3 ft. (34.2-34.8 m)	0.08	0.06	

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. Some sulphide-bearing intervals are graphitic, suggesting a biogenic component to the sequence.

REFERENCES

A.F. 91619, 92351 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

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1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

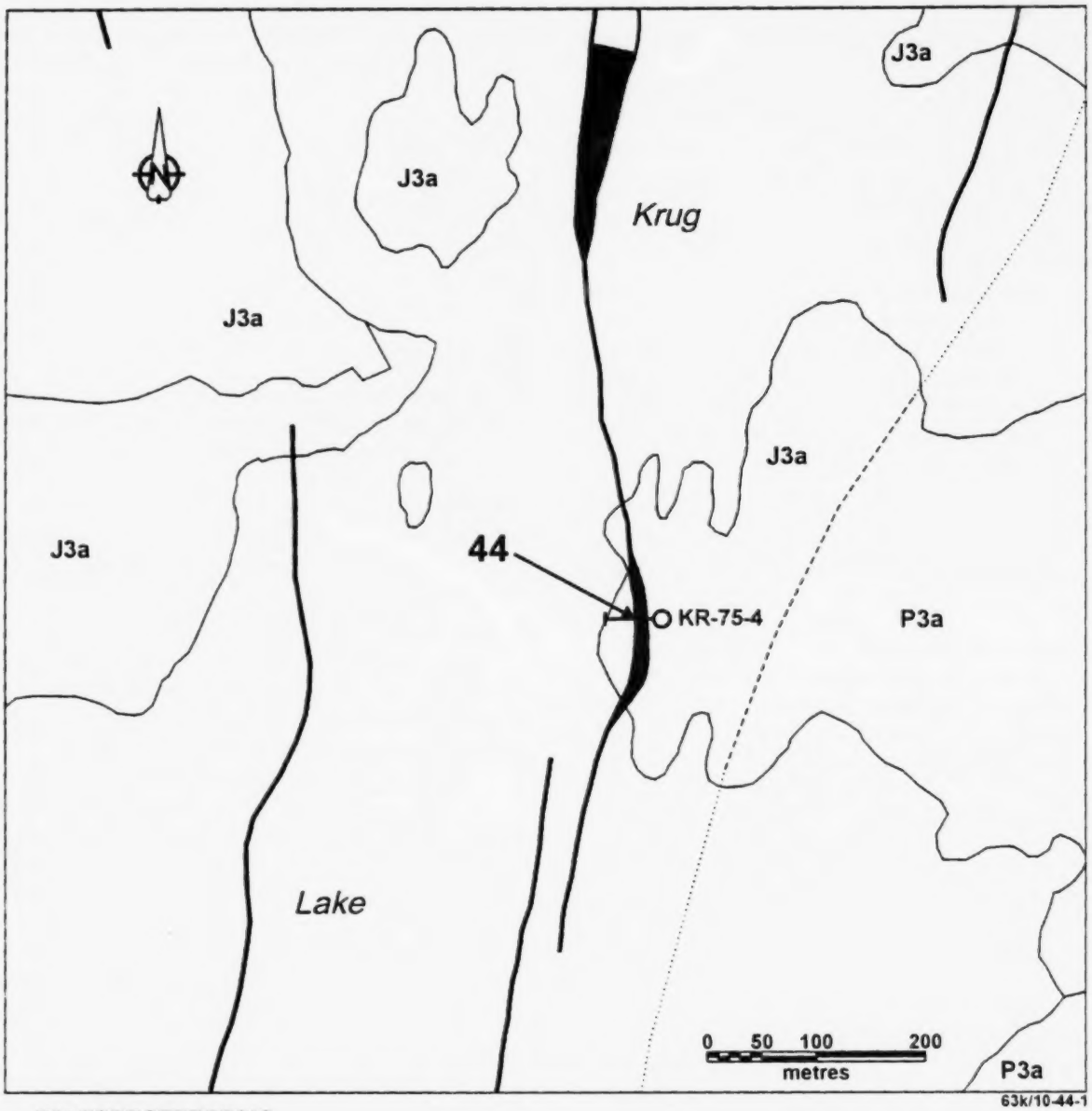
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92351)

Drillhole (A.F. 92351)

44 Mineral occurrence location

Figure 44-1: Geological setting of Occurrence 44.

LOCATION: 45

NAME: mineralization intersected by diamond drilling.
UTM: 399605 E 6062675 N
AREA: under Krug Lake approximately 3.9 km south of the railway bridge.
ACCESS: by vehicle along abandoned rail line from Chisel Lake and boat, or via bush aircraft.
AIRPHOTO: A26325-204

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352), who drilled several ground EM conductors in the area in 1975 (A.F. 92351).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 45-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the east of the occurrence.

Hole KR-75-3 intersected a sequence of fine grained, moderately to strongly foliated rhyolitic to dacitic metavolcanic rocks with a lesser epiclastic ("greywacke") and graphitic component (A.F. 92351), suggesting a biogenic contribution. Much of the volcanic sequence is described as being fragmental.

MINERALIZATION

In hole KR-75-3, sulphides occur within "fragmental meta-dacite" and in the contact area of this unit with lower graphitic, and chloritic and sericitic "meta-rhyolite", and occurs over the following intervals (A.F. 92351):

Interval	Mineralization
103.0-104.5 ft. (31.4-31.9 m)	30% pyrrhotite
156.1-159.2 ft. (47.6-48.5 m)	5% pyrite, 5% pyrrhotite
190.7-191.0 ft. (58.1-58.2 m)	near solid pyrite
201.6-222.9 ft. (61.4-67.9 m)	25-30% pyrite, <3-10% pyrrhotite, to 60% graphite

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals sampled in hole KR-75-3 (A.F. 92351):

Interval	%Cu	%Zn	%Ni
103.5-104.5 ft. (31.5-31.9 m)	0.07	tr	
190.7-191.7 ft. (58.1-58.4 m)	0.05	0.05	
201.6-208.2 ft. (61.4-63.5 m)	0.09	0.41	0.03
208.2-213.2 ft. (63.5-65.0 m)	0.02	0.04	tr

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 91619, 92351 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

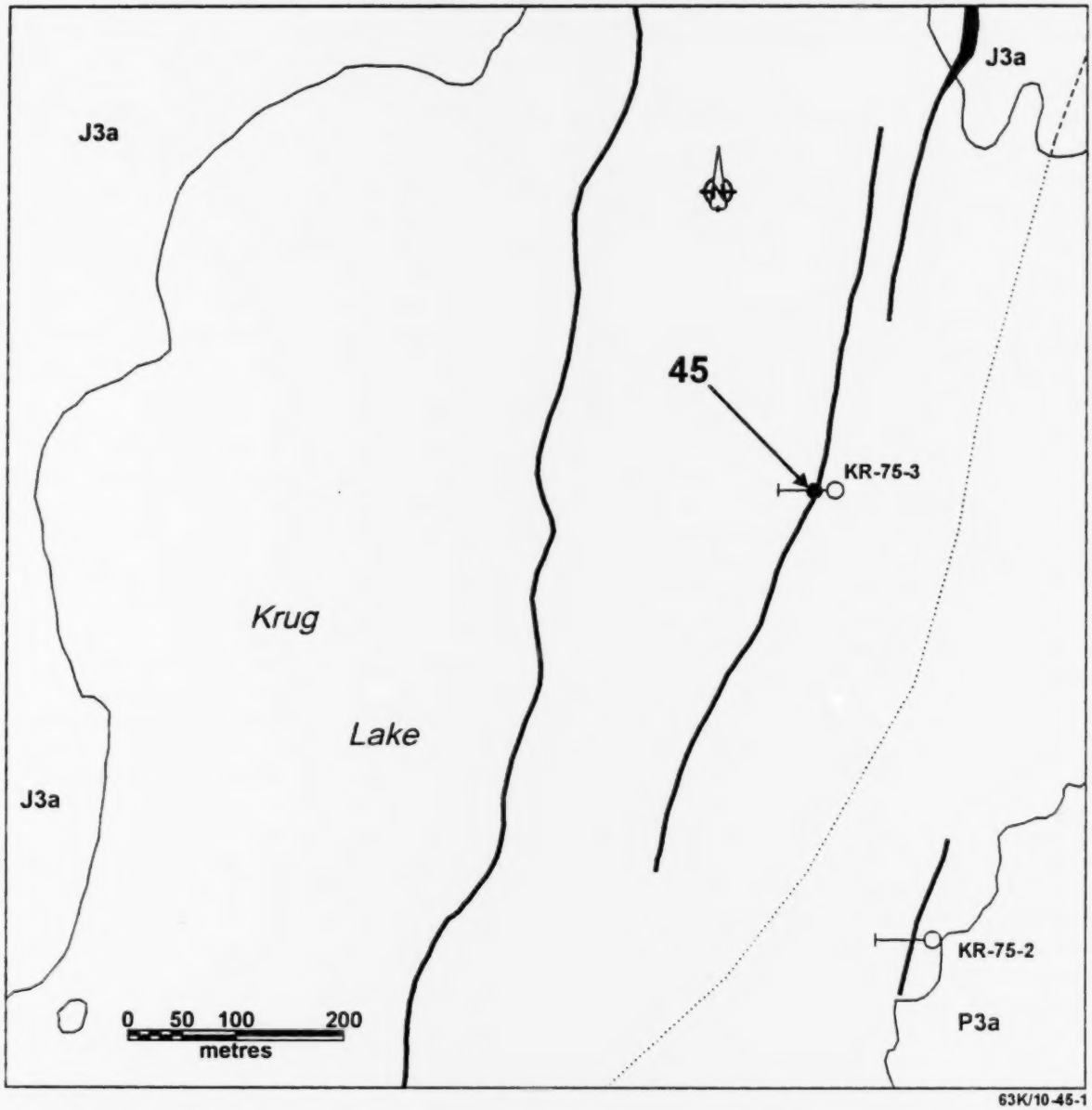
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92351)

Drillhole (A.F. 92351)

45 ● Mineral occurrence location

Figure 45-1: Geological setting of Occurrence 45.

LOCATION: 46

NAME: mineralization intersected by diamond drilling
UTM: 399695 E 6062265 N
AREA: on east side of Krug Lake approximately 4.3 km south of the railway bridge
ACCESS: by vehicle along abandoned rail line from Chisel Lake and boat, or via bush aircraft
AIRPHOTO: A26325-204

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352), who drilled several ground EM conductors in the area in 1975 (A.F. 92351).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 46-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the east of the occurrence.

The sequence intersected in hole KR-75-2 is dominated by a moderately to strongly foliated rhyodacitic fragmental metavolcanic rock. From 65.2 to 120.0 ft. (19.9 to 36.6 m) the fragmental unit contains pyrite and pyrrhotite, with bands of graphite. The fragments occur in a chloritic matrix (A.F. 92351).

MINERALIZATION

Sulphides in hole KR-75-2 occur within "fragmental meta-dacite" and in the contact area of this unit with lower graphitic, and chloritic and sericitic "meta-rhyolite", over the following intervals (A.F. 92351):

Interval	Mineralization
63.1-63.4 ft. (19.2-19.3 m)	50% pyrrhotite, <2% pyrite
65.2-73.6 ft. (19.9-22.4 m)	30% pyrrhotite, 10% pyrite, to 60% graphite
74.6-119.5 ft. (22.7-36.4 m)	10-50% pyrrhotite, 10-30% pyrite, to 60% graphite
124.4-128.0 ft. (37.9-39.0 m)	40% pyrite, 5% pyrrhotite, 50% graphite, tr chalcopyrite

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals sampled in hole KR-75-2 (A.F. 92351):

Interval	%Cu	%Zn	%Ni
63.1-64.7 ft. (19.2-19.7 m)	0.01	0.02	0.03
65.2-73.6 ft. (19.9-22.4 m)	0.06	tr	0.03
74.6-84.7 ft. (22.7-25.8 m)	0.06	0.02	tr
84.7-94.0 ft. (25.8-28.7 m)	0.04	0.02	0.03
94.0-100.8 ft. (28.7-30.7 m)	0.03	tr	0.02
100.8-110.5 ft. (30.7-33.7 m)	0.05	0.02	0.03
110.5-115.9 ft. (33.7-35.3 m)	0.06	tr	0.02
115.9-119.5 ft. (35.3-36.4 m)	0.08	0.02	0.03
124.4-128.0 ft. (37.9-39.0 m)	0.14	tr	0.06

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 91619, 92351 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

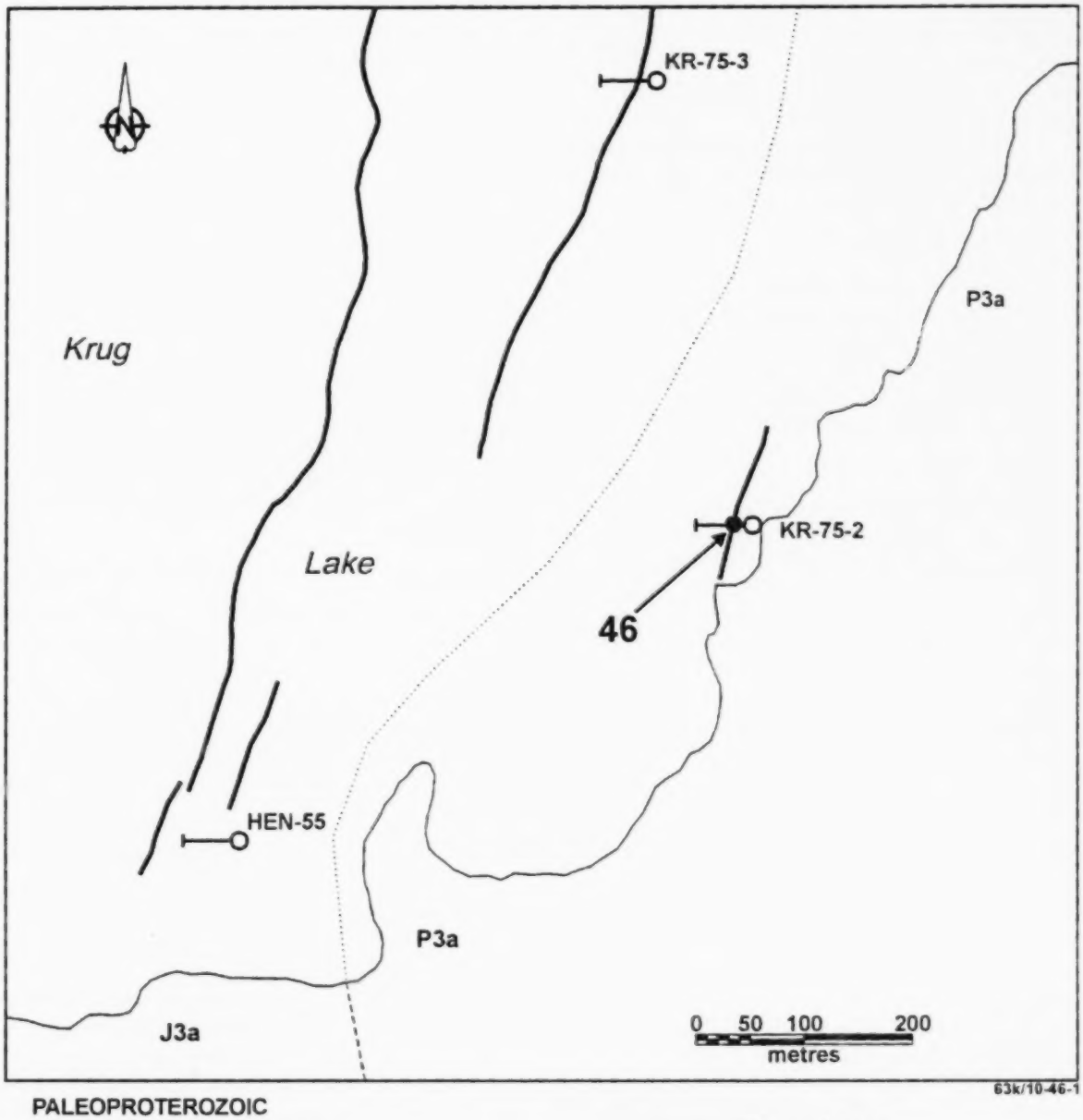
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92351)

Drillhole (A.F. 92351)

46 Mineral occurrence location

Figure 46-1: Geological setting of Occurrence 46.

LOCATION: 47

NAME: mineralization intersected by diamond drilling
UTM: 399160 E 6061970 N
AREA: under Krug Lake approximately 4.6 km south of the railway bridge
ACCESS: by vehicle along abandoned rail line from Chisel Lake and boat, or via bush aircraft
AIRPHOTO: A26325-204

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 47-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the east of the occurrence. Mafic tectonite with mafic-felsic intrusive sheets (unit W6b) occurs to the west, close to the western shoreline of Krug Lake.

The litholog for hole HEN-55 indicates that a sequence of "chlorite schist, trachyte and trachyte schist, and dacite schist" was intersected (A.F. 90250), suggesting that the assemblage is made up dominantly of felsic metavolcanic rock types. Much of the sequence is described as being quartz and feldspar phyric.

MINERALIZATION

Hole HEN-55 intersected pyrite with lesser pyrrhotite and graphite are hosted by quartz and feldspar phyric "trachyte schist" over the following intervals (A.F. 90250):

Interval	Mineralization
202.0-206.3 ft. (61.6-62.9 m)	well mineralized with pyrite, sl pyrrhotite and graphite
247.2-257.0 ft. (75.3-78.3 m)	well mineralized with pyrite and graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90250, 91619 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

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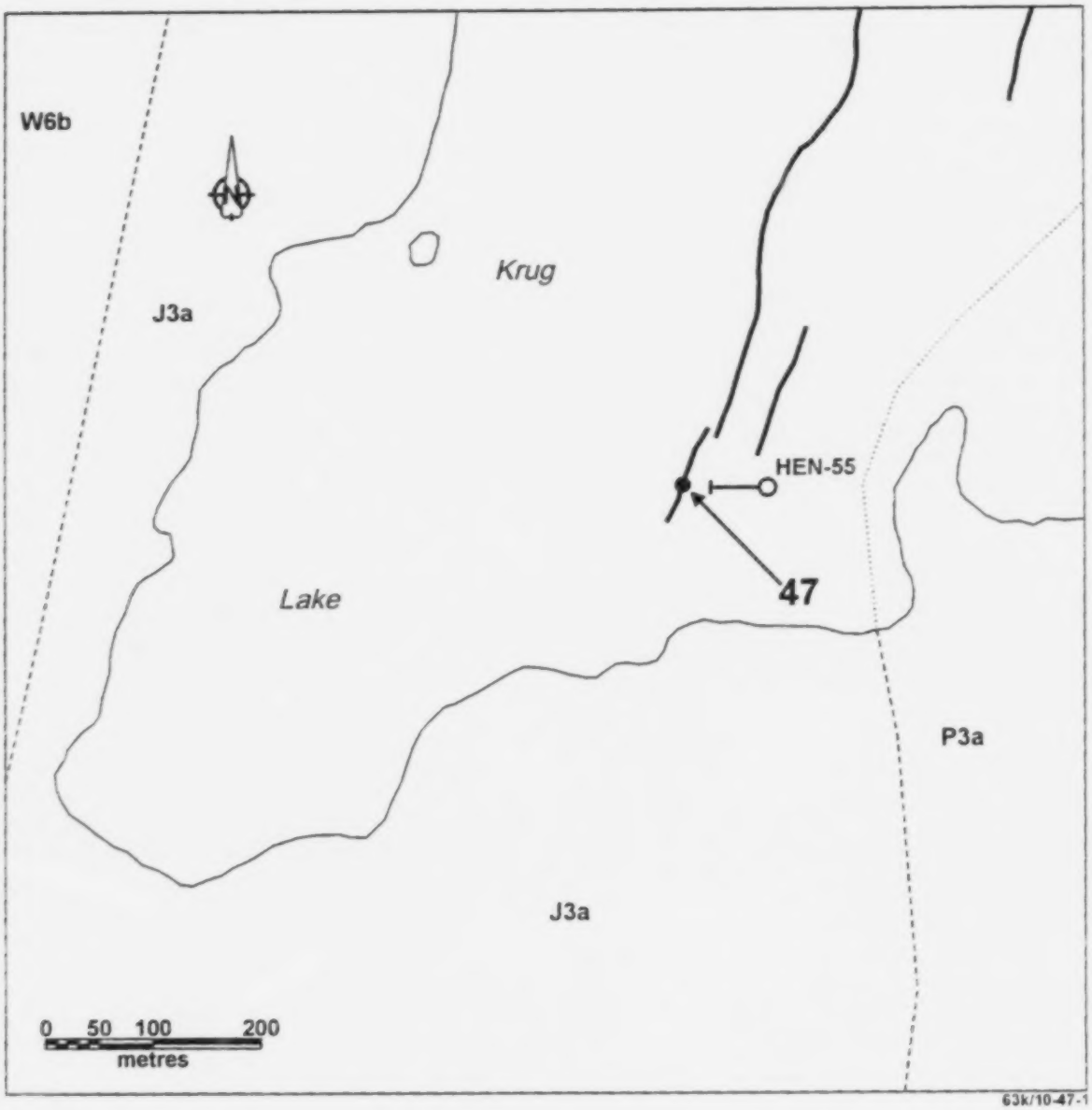
Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

------- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250)

Drillhole (A.F. 90250)

47 ● Mineral occurrence location

Figure 47-1: Geological setting of Occurrence 47.

LOCATION: 48

NAME: mineralization intersected by diamond drilling.
UTM: 400920 E 6062300 N
AREA: under Reed Lake approximately 600 m W of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-19

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 48-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the west of the occurrence, and gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the east.

Hole 18 intersected a sequence dominated by quartz phyric felsic metavolcanic rocks intercalated with massive fine- to medium-grained diorite (A.F. 92736).

MINERALIZATION

The first mineralized interval in hole 18 occurs in "andesite" containing quartz phenocrysts, situated below massive grey rhyolite. The host lithology for the remaining two intervals are not described in the lithologs, but occur adjacent to massive quartz diorite units (A.F. 92736). The following summarizes the mineralized intervals intersected:

Interval	Mineralization
139.0-139.5 ft. (42.4-42.5 m)	30% pyrite
366.0-369.0 ft. (111.6-112.5 m)	30% pyrite, minor pyrrhotite, chalcopyrite, sphalerite
410.0-412.0 ft. (125.0-125.6 m)	well mineralized with pyrite, minor sphalerite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 91619, 92352 and 92736; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

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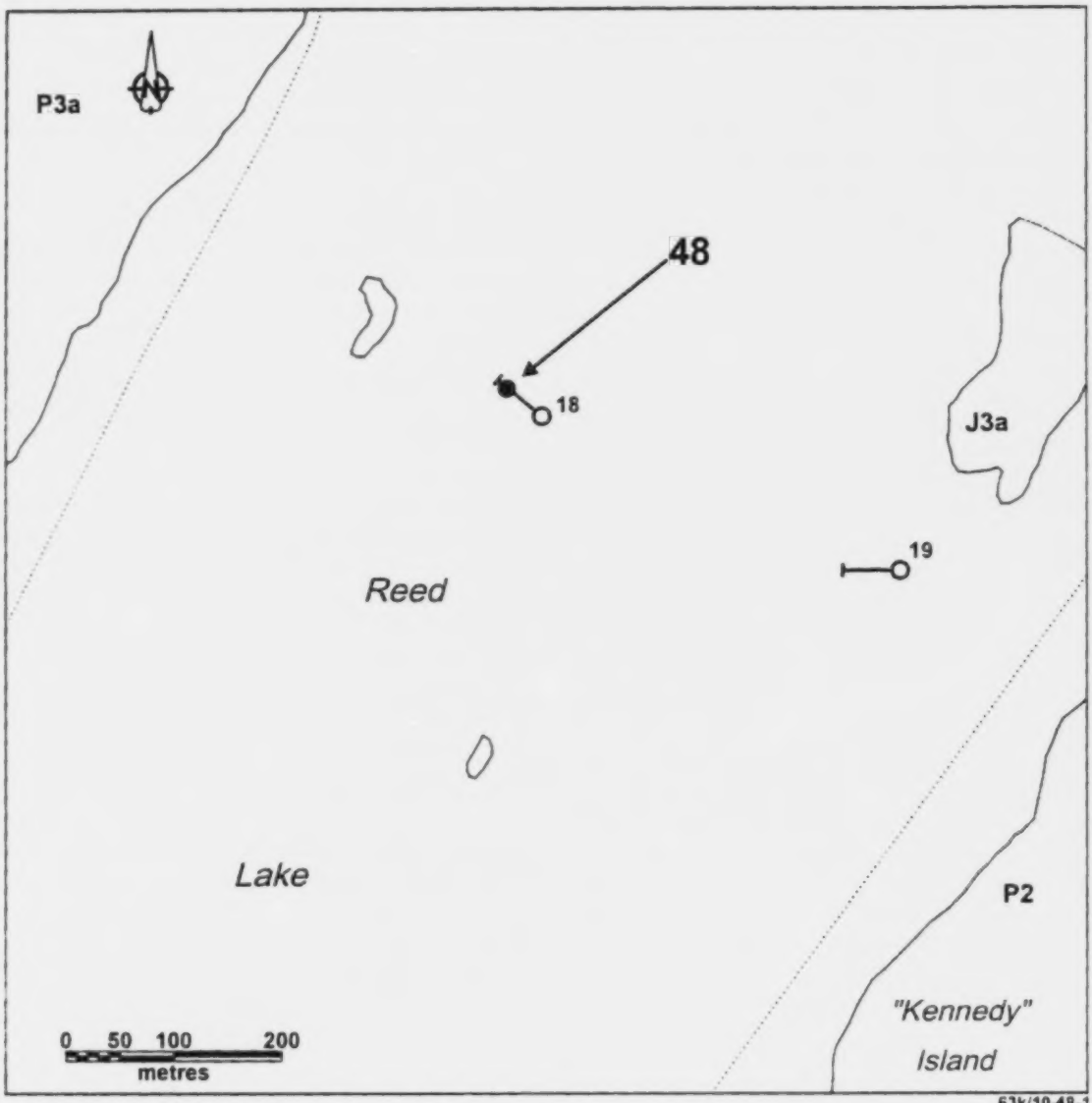
Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Drillhole (A.F. 92736)

48 Mineral occurrence location

Figure 48-1: Geological setting of Occurrence 48.

LOCATION: 49

NAME: mineralization intersected by diamond drilling.
UTM: 401225 E 6062130 N
AREA: under Reed Lake approximately 200 m W of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-19

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 49-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) belonging to the Josland Lake gabbro (Bailes, 1980) occur to the NW of the occurrence, and gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the SE.

Hole 19 intersected a sequence dominated by massive, fine- to medium-grained diorite with lesser schistose dacite (A.F. 92736). Contacts between the units are described as being gradational.

MINERALIZATION

The host lithology for the first mineralized interval, consisting mainly of pyrrhotite, was not specified in the litholog, but appears to be at the contact between massive medium grained diorite and dacite. The second interval is within a felsic metavolcanic unit ("dacite"). The following summarizes the mineralized intervals intersected in hole 19:

Interval	Mineralization
435.0-436.3 ft. (132.6-133.0 m)	near massive pyrrhotite, minor pyrite, chalcopyrite, sphalerite
478.5-479.0 ft. (145.8-146.0 m)	40% pyrrhotite

GEOCHEMICAL DATA

The following assays were obtained from the first mineralized interval in hole 19 (A.F. 92736):

Interval	%Cu	%Zn	%Ni	Au (g/t)	Ag (g/t)
434.9-436.0 ft. (132.6-132.9 m)	0.19	0.48	0.04	tr	2.7

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 91619, 92352 and 92736; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

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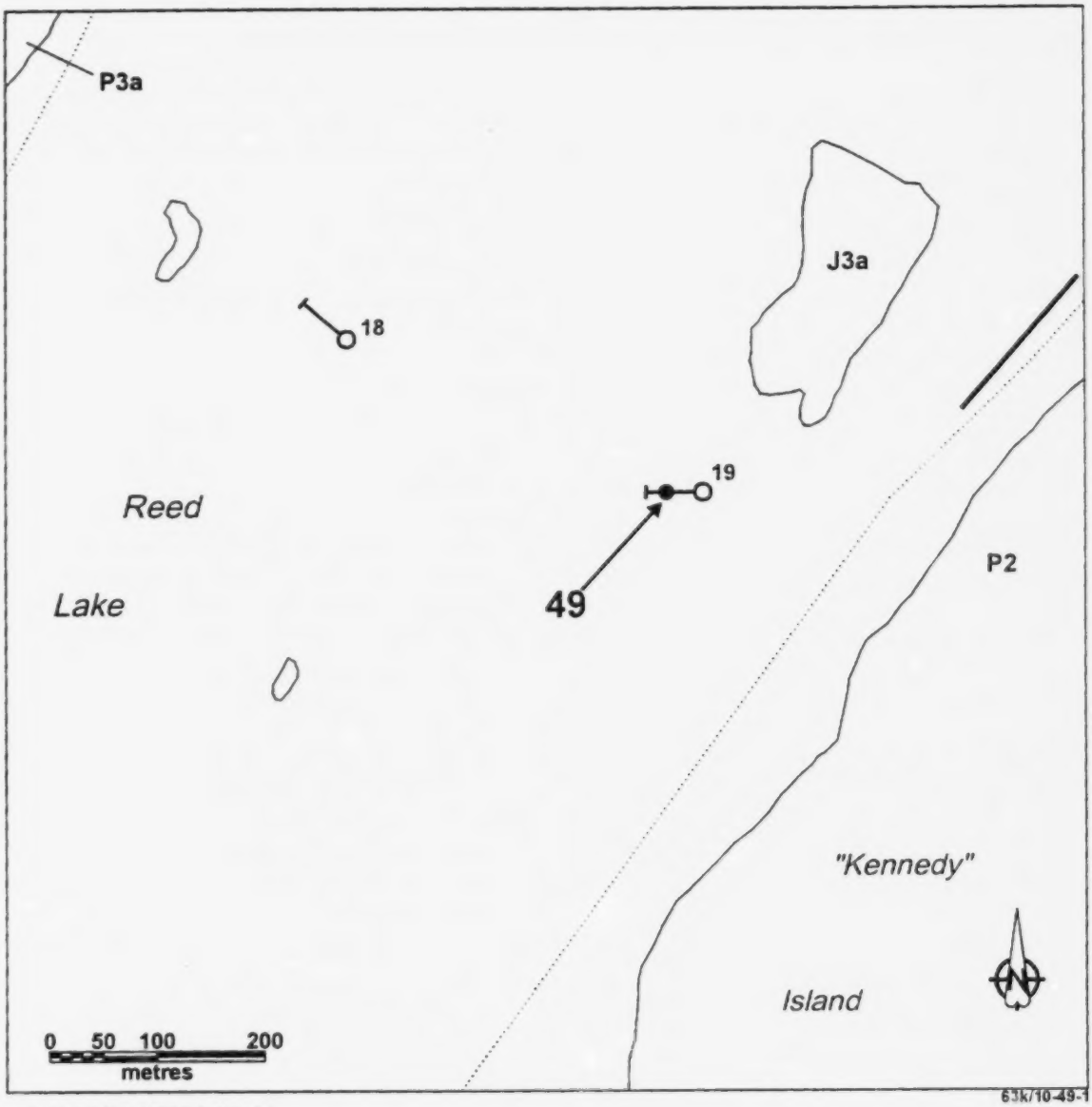

PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92736)

Drillhole (A.F. 92736)

49 Mineral occurrence location

Figure 49-1: Geological setting of Occurrence 49.

LOCATION: 50

NAME: mineralization intersected by diamond drilling.
UTM: 401620 E 6062325 N
AREA: under Reed Lake near NW shore of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-19

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 50-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the SE.

Hole HEN-9 intersected a sequence of rhyolitic and siliceous sericitic rocks (A.F. 90252). Minor diorite occurs at the top of the hole. Narrow graphitic intervals are present. The lithologic descriptions in the litholog suggest that the rocks in the area are extensively altered: sericitic units are ubiquitous and chloritic intervals common.

MINERALIZATION

Most of the sequence intersected by hole HEN-9 contains variable amounts of sulphides, including the following (A.F. 90252):

Interval	Mineralization
121.6-123.8 ft. (37.1-37.7 m)	well mineralized to near solid sulphides: pyrite, pyrrhotite
125.2-126.8 ft. (38.2-38.6 m)	well mineralized to near solid sulphides: pyrite, pyrrhotite
236.8-239.0 ft. (72.2-72.8 m)	well mineralized to near solid sulphides: pyrite, pyrrhotite, graphite
240.8-313.0 ft. (73.4-95.4 m)	near solid sulphides pyrite, pyrrhotite, graphite, tr chalcopyrite
546.5-547.5 ft. (166.6-166.9 m)	near solid sulphides pyrite, pyrrhotite
552.0-553.0 ft. (168.2-168.6 m)	well mineralized to near solid sulphides: pyrite, pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Stratabound massive sulphide type deposit. The presence of sericite and chloritic intervals suggest hydrothermal effects. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90252, 91619 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

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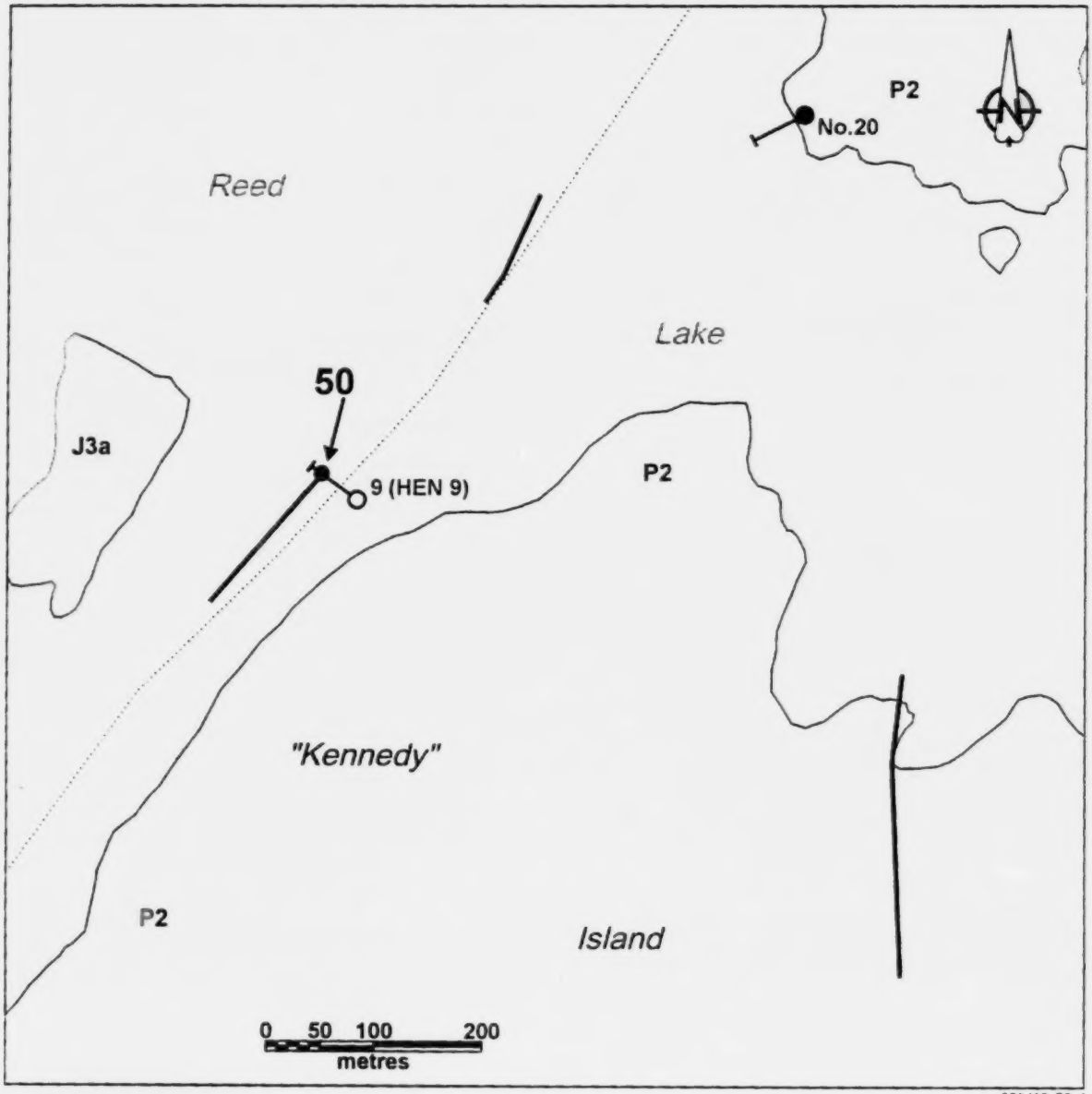
Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

..... Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90252)

Drillhole (A.F. 90252)

50 ● Mineral occurrence location

Figure 50-1: Geological setting of Occurrence 50.

LOCATION: 51

NAME: mineralization intersected by diamond drilling.
UTM: 402005 E 6062620 N
AREA: under Reed Lake approximately 300 m N of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-19

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). Several holes were drilled north of Kennedy Island in 1972 by Mr A.L. Parres (A.F. 92183). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 51-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occur to the NW. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

Hole 20 intersected a sequence of intercalated massive, fine- to medium-grained dioritic and fine grained mafic to felsic metavolcanic units (A.F. 92183). Some of the metavolcanic rocks are described as being "silicified", and may be rhyolites.

MINERALIZATION

A high proportion of the cored interval contains at least moderate amounts of sulphide mineralization, mostly as fine grained disseminations (A.F. 92183). Pyrite and pyrrhotite are the only significant sulphides noted in the lithologs. The main mineralized intervals intersected by hole 20 are summarized below:

Interval	Mineralization
129.0-216.0 ft. (39.3-65.8 m)	to 40% sulphides (pyrrhotite+pyrite)
229.0-262.0 ft. (69.8-79.9 m)	to 15% sulphides (pyrrhotite+pyrite)
368.0-368.5 ft. (112.2-112.3 m)	10% pyrrhotite
382.0-383.0 ft. (116.4-116.7 m)	10% pyrrhotite
427.0-437.0 ft. (130.1-133.2 m)	5-10% pyrrhotite
513.0-662.5 ft. (156.4-201.9 m)	to 15% pyrite and pyrrhotite, with earthy pyrite and graphite

GEOCHEMICAL DATA

The following assays were obtained from sampled intervals in hole 20 (A.F. 92183):

Interval	%Cu	%Zn	%Ni
140.1-145.1 ft. (42.7-44.2 m)	0.03	tr	0.02
150.3-155.3 ft. (45.8-47.3 m)	0.03	tr	tr
188.0-193.0 ft.) 57.3-58.8 m)	tr	0.05	0.02
371.0-373.3 ft. (113.1-113.8 m)	0.02	0.02	tr
525.0-530.0 ft. (160.0-161.5 m)	tr	0.02	—

No gold or silver values were returned from the sampled intervals.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90252, 91619, 92183 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

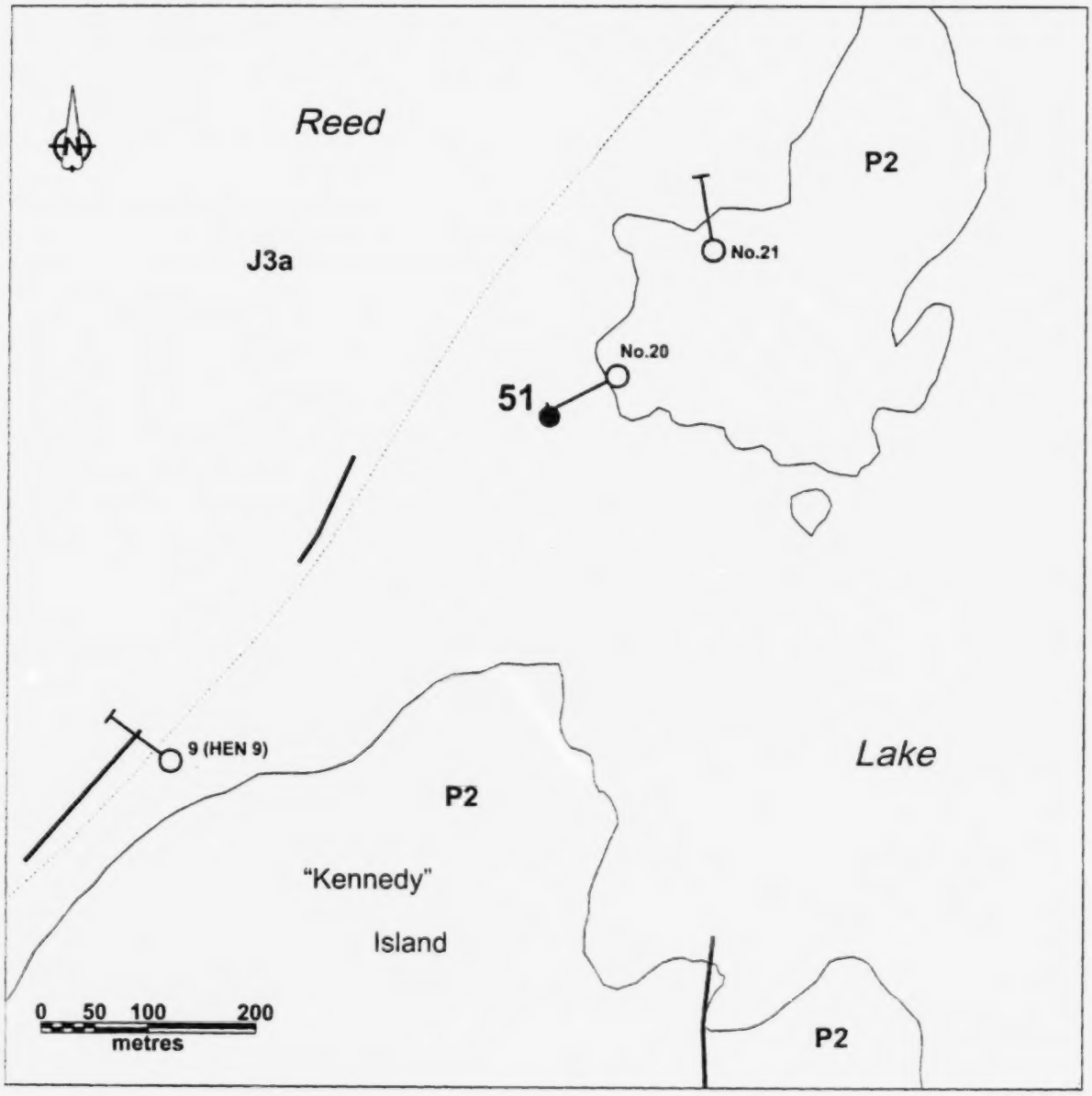
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90252)

Drillhole (A.F. 92183)

51 Mineral occurrence location

Figure 51-1: Geological setting of Occurrence 51.

LOCATION: 52

NAME: mineralization intersected by diamond drilling.
UTM: 402145 E 6062820 N
AREA: on small island in Reed Lake approximately 400 m NNE of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-18

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). Several holes were drilled north of Kennedy Island in 1972 by Mr A.L. Parres (A.F. 92183). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 52-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occur to the NW. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

Hole 21 intersected a sequence of intercalated massive, fine- to medium-grained dioritic and fine grained mafic to intermediate metavolcanic units. (A.F. 92183).

MINERALIZATION

Disseminated and stringer pyrrhotite and minor pyrite hosted by "silicified andesite" occur in hole 21 over the following intervals (A.F. 92183):

Interval	Mineralization
335.5-368.0 ft. (102.3-112.2 m)	10-15% sulphides, pyrrhotite, minor pyrite
401.5-419.0 ft. (122.4-127.7 m)	to 15% sulphides, pyrrhotite, minor pyrite, graphite
452.0-471.0 ft. (137.8-143.6 m)	short sections to 20% pyrrhotite, minor pyrite, graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90252, 91619, 92183 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

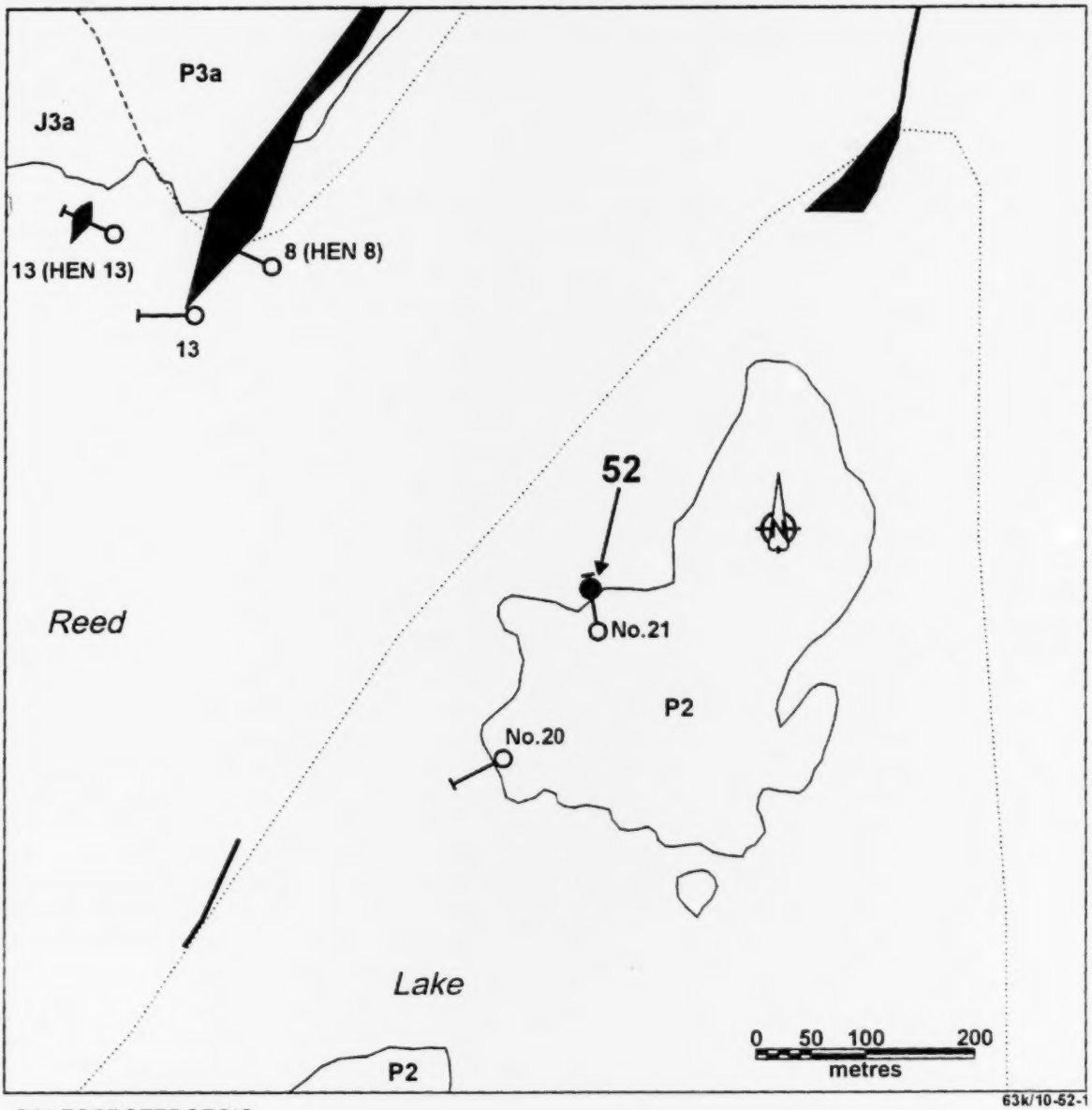
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92183)

Drillhole (A.F. 92183)

52 Mineral occurrence location

Figure 52-1: Geological setting of Occurrence 52.

LOCATION: 53

NAME: mineralization intersected by diamond drilling.
UTM: 401675 E 6063155 N
AREA: under Reed Lake approximately 800 m N of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-18

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 53-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the SE. Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980) occur to the north of the occurrence.

The sequence intersected in hole HEN-13 consists of intercalated felsic metavolcanic rocks (rhyolite) and sericite schist (A.F. 90252).

MINERALIZATION

The host lithology of the sulphide mineralization was not described in the litholog for this hole, but appears to be sericite schist derived from surrounding rhyolitic units (A.F. 90252). Carbonate and quartz are indicated as common constituents associated with the sulphides. The distribution of the mineralization in hole HEN-13 is summarized as follows:

Interval	Mineralization
105.9-140.7 ft. (32.3-42.9 m)	near solid to solid sulphide (pyrite, pyrrhotite), graphite, tr chalcopyrite
147.0-226.0 ft. (44.8-68.9 m)	near solid to solid sulphide (pyrite, pyrrhotite), graphite, tr chalcopyrite
247.3-251.0 ft. (75.4-76.5 m)	near solid to solid sulphide (pyrite, pyrrhotite)
264.0-267.8 ft. (80.5-81.6 m)	near solid sulphide (pyrite, pyrrhotite)

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90252, 91619 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

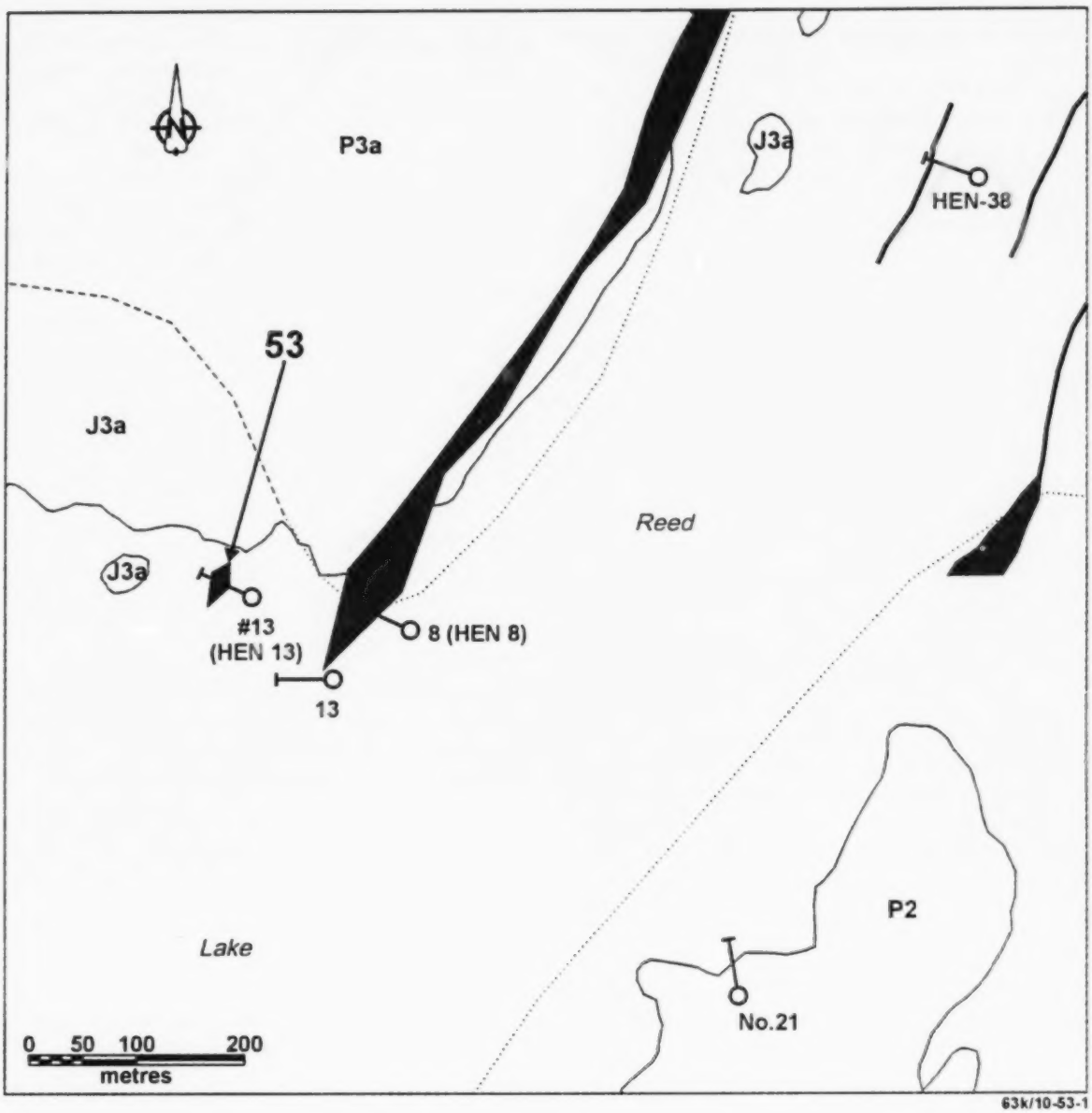
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Group, 1998

EM conductor (A.F. 90266)

Drillhole (A.F. 90252)

53 Mineral occurrence location

Figure 53-1: Geological setting of Occurrence 53.

LOCATION: 54

NAME: mineralization intersected by diamond drilling.
UTM: 401790 E 6063110 N
AREA: under Reed Lake approximately 800 m N of north end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-18

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 54-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the SE. Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills, occur to the north of the occurrence.

The sequence intersected by hole HEN-8 consists mainly of felsic metavolcanic rocks (rhyolite and dacite) and intercalated sericitic and lesser chloritic equivalents (A.F. 90252). The sequence intersected in hole 13 is similar, but includes more mafic metavolcanic ("andesite") and massive fine- to medium-grained dioritic intervals (A.F. 92736).

MINERALIZATION

In hole HEN-8, the sulphide (pyrrhotite and pyrite) mineralization occurs in sericite schist and moderately sericitic rhyolitic rocks (A.F. 90252). The rock type associated with the sulphide mineralization in hole 13 is unclear, but the litholog suggests a close relationship to felsic metavolcanic lithologies consisting of feldspar porphyry, schistose dacite and "silicified" intervals (A.F. 92736). The main mineralized intervals in the two holes are summarized as follows (see table below).

Interval	Mineralization
hole HEN-8	
276.5-279.0 ft. (84.3-85.0 m)	well mineralized to solid sulphides (pyrite, pyrrhotite)
305.0-310.0 ft. (93.0-94.5 m)	near solid to solid sulphides (pyrite, pyrrhotite)
376.0-416.0 ft. (114.6-126.8 m)	near solid to solid sulphides (pyrite, pyrrhotite), tr chalcopyrite
428.8-432.0 ft. (130.7-131.7 m)	near solid to solid sulphides (pyrite, pyrrhotite), minor graphite
444.0-447.0 ft. (135.3-136.2 m)	near solid to solid sulphides (pyrite, pyrrhotite)
465.0-532.0 ft. (141.7-162.2 m)	near solid to solid sulphides (pyrite, pyrrhotite), graphite
567.5-592.0 ft. (173.0-180.4 m)	near solid to solid sulphides (pyrite, pyrrhotite), minor graphite, tr chalcopyrite
hole 13	
200.0-232.0 ft. (61.0-70.7 m)	to 10% pyrite, minor graphite
244.0-311.0 ft. (74.4-94.8 m)	to 10% pyrite with pyrrhotite, graphite, tr sphalerite
317.0-352.0 ft. (96.6-107.3 m)	to 25% pyrite with pyrrhotite, graphite
482.0-540.0 ft. (146.9-164.6 m)	to near massive sulphides (pyrite and pyrrhotite), minor graphite
554.0-559.0 ft. (168.9-170.4 m)	near massive sulphides, graphite
582.0-585.0 ft. (174.-178.3 m)	near massive sulphides, mainly pyrrhotite
591.0-593.0 ft. (180.1-180.7 m)	near massive pyrrhotite
598.0-600.0 ft. (182.3-182.9 m)	near massive pyrrhotite
634.0-636.0 ft. (193.2-193.9 m)	20% pyrrhotite

GEOCHEMICAL DATA

Assay results for the mineralized intervals have only been reported for hole 13 (A.F. 92736) (see table below).

Interval	%Cu	%Zn	%Ni	Au (g/t)	Ag (g/t)
265.0-270.0 ft. (80.8-82.3 m)	0.03	0.04		tr	tr
425.5-430.5 ft. (129.7-131.2 m)	0.05	0.16	tr	0.4	3.1
470.0-475.0 ft. (143.3-144.8 m)	0.03	0.12		tr	2.1
499.0-504.0 ft. (152.1-153.6 m)		0.11		0.4	5.8

CLASSIFICATION

Stratabound massive sulphide type deposit. The presence of sericite and chloritic intervals indicates hydrothermal effects. The presence of graphite suggests a biogenic contribution.

REFERENCES

A.F. 90252, 91619, 92352 and 92736; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

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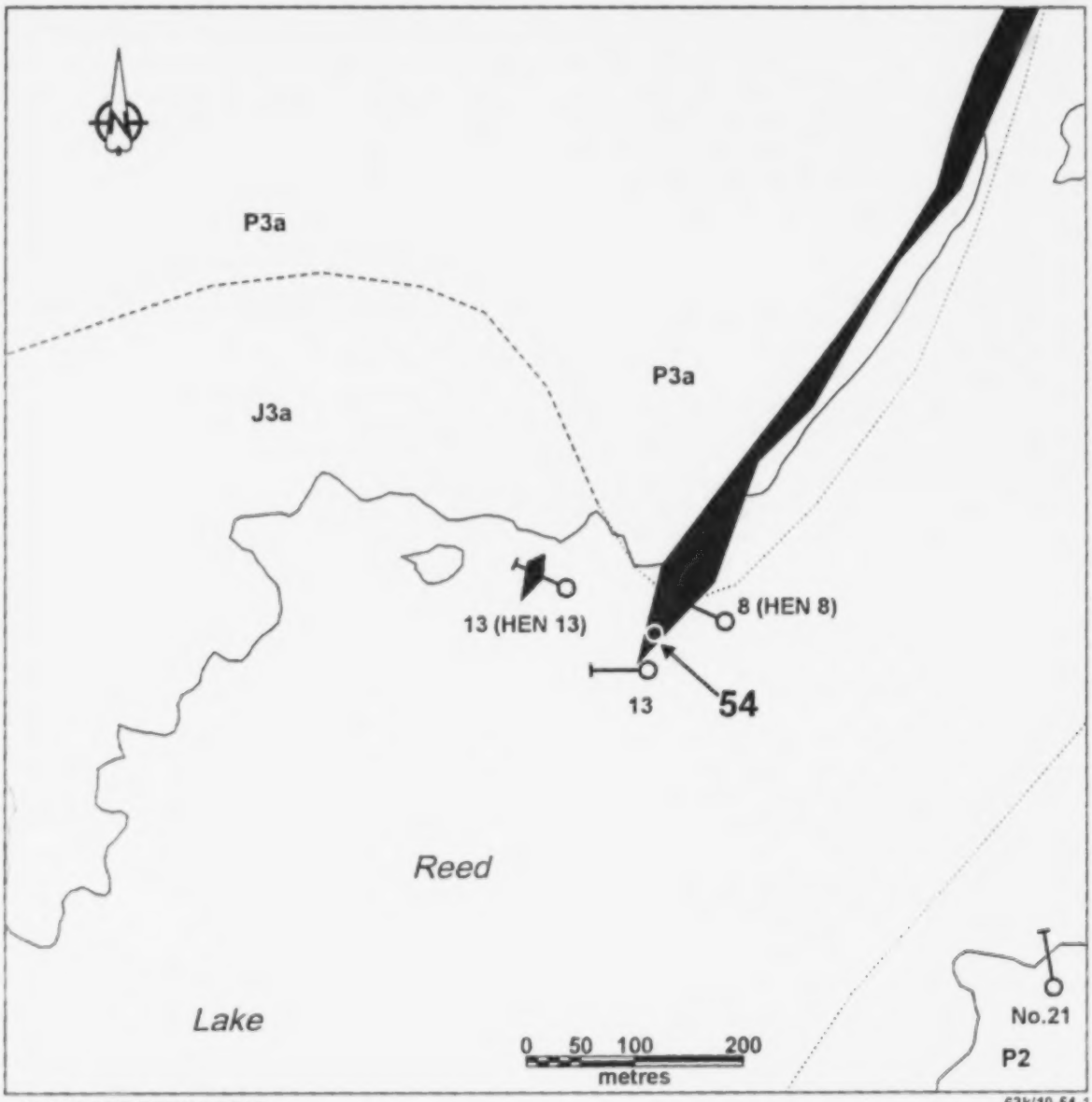


PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated).- NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90252, 92736)

Drillhole (A.F. 90252, 92736)

54 Mineral occurrence location

Figure 54-1: Geological setting of Occurrence 54.

LOCATION: 55

NAME: mineralization intersected by diamond drilling.
UTM: 401750 E 6064800 N
AREA: between Krug Lake and Petersons Bay, Reed Lake, approximately 900 m W of Petersons Bay.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26325-17

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). An EM survey using loop frame equipment was performed over the occurrence in 1957-58 by Hudson Bay Exploration and Development Company, Limited (A.F. 90266), and a hole drilled to test one of the conductive responses (A.F. 90265). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 55-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by ferrogabbro (unit P3b) and gabbronorite and gabbro (unit P3a), which are part of the the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills, intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks.

Hole HEN-107 intersected a sequence of intercalated fine- to coarse-grained dioritic to gabbroic and metavolcanic ("andesite") units (A.F. 90265).

MINERALIZATION

In hole HEN-107, sulphide mineralization occurs within "andesite" as summarized below (A.F. 90265):

Interval	Mineralization
269.6-280.3 ft. (82.2-85.4 m)	well mineralized with pyrrhotite, slight pyrite, trace chalcopyrite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

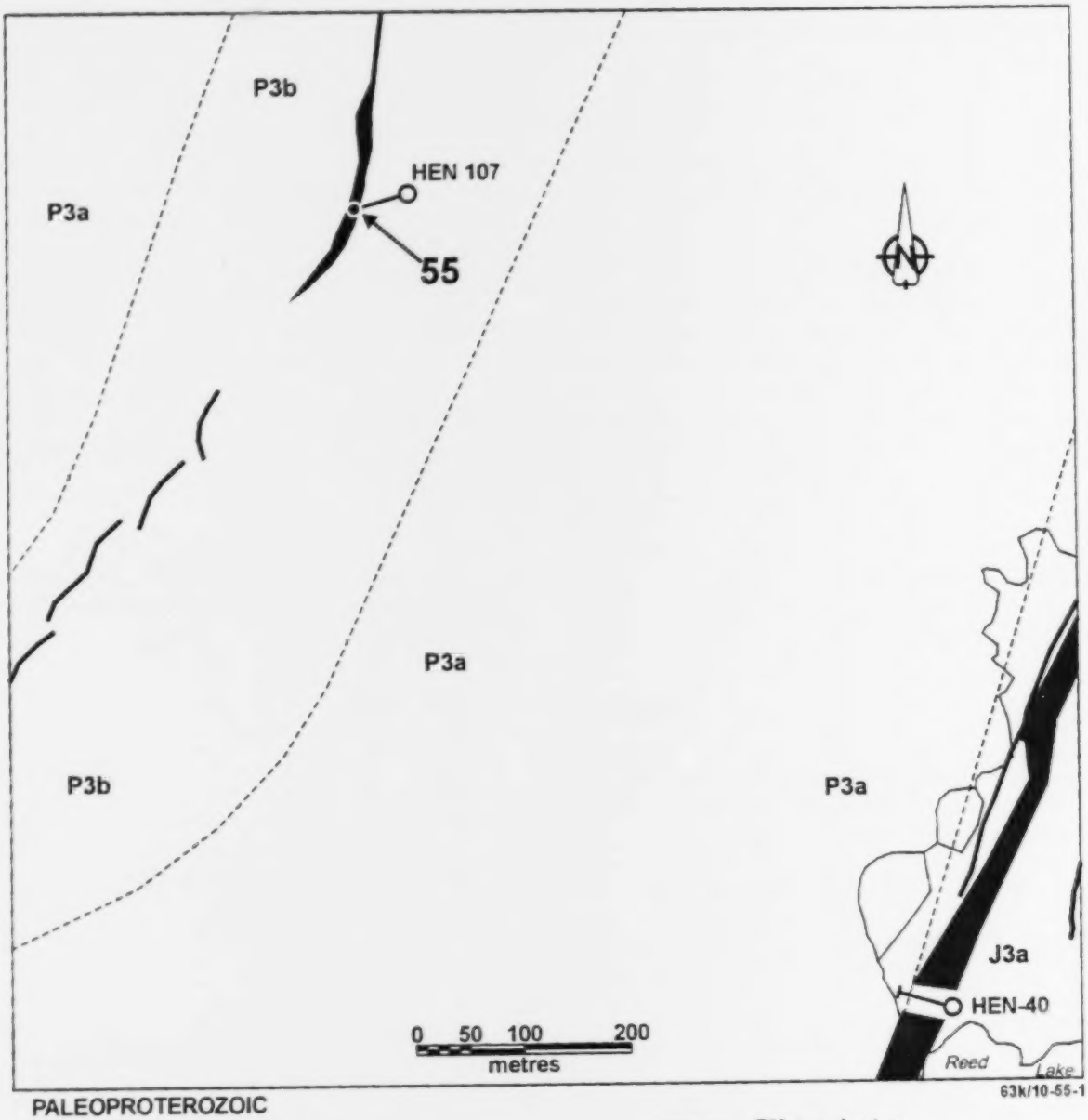
A.F. 90265, 90266, 91619 and 92352; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P3b Ferrogabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

------ Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90266)

Drillhole (A.F. 90265)

55 • Mineral occurrence location

Figure 55-1: Geological setting of Occurrence 55.

LOCATION: 56

NAME: mineralization intersected by diamond drilling.
UTM: 402580 E 6064965 N
AREA: approximately 200 m W of Petersons Bay, Reed Lake.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 56-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, occur to the west of the occurrence, which is located near the contact between the two units.

The sequence intersected by drillhole HEN-43 consists of siliceous, fine grained, felsic metavolcanic lithologies (described as "andesite" and "dacite") and medium grained diorite (A.F. 90250).

MINERALIZATION

The sulphide mineralization in hole HEN-43 is associated with a fine grained siliceous rock type that may be a rhyolite, although it is described in the litholog as a dacite (A.F. 90250). The mineralization occurs in the lower half of this unit, and is summarized as follows:

Interval	Mineralization
241.2-241.6 ft. (73.5-73.6 m)	near solid pyrrhotite
246.0-253.3 ft. (75.0-77.2 m)	near solid pyrrhotite
275.3-278.2 ft. (83.9-84.8 m)	near solid pyrrhotite, trace chalcopyrite
278.9-281.1 ft. (85.0-85.7 m)	near solid pyrrhotite, trace chalcopyrite
283.5-284.3 ft. (86.4-86.7 m)	near solid pyrrhotite
284.7-285.4 ft. (86.8-87.0 m)	near solid pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

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Syme, E.C., Bailes, A.H. and Lucas, S.B.

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Syme, E.C. and Bailes, A.H.

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Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

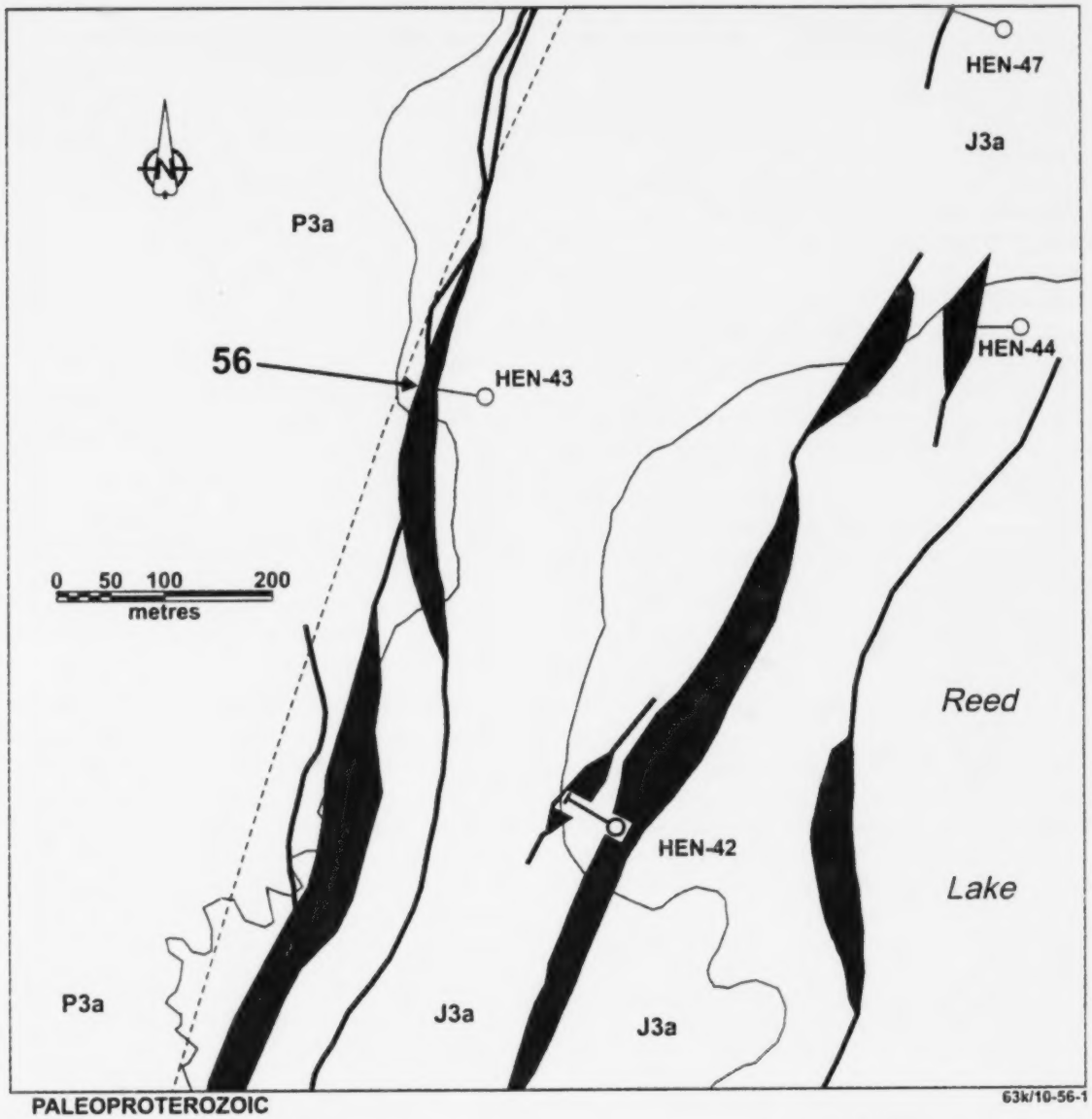


Figure 56-1: Geological setting of Occurrence 56.

LOCATION: 57

NAME: mineralization intersected by diamond drilling.
UTM: 403070 E 6065315 N
AREA: approximately 200 m N of Petersons Bay, Reed Lake.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Ground electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 57-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks occur to the west of the occurrence.

The lithologic sequence intersected by drillhole HEN-47 is dominated by a fine grained felsic rock type ("dacite") parts of which are quartz-, feldspar- and biotite-phyric. Parts of this unit may be fragmental. A more mafic lithology ("andesite") occurs at the top of the hole (A.F. 90250).

MINERALIZATION

Pyrrhotite is hosted by the felsic unit, but its character has not been described (A.F. 90250). Significant mineralized intervals in hole HEN-47 are summarized below.

Interval	Mineralization
273.5-274.0 ft. (83.4-83.5 m)	pyrrhotite
330.7-356.4 ft. (100.8-108.6 m)	massive pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral ResourcesDivision, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

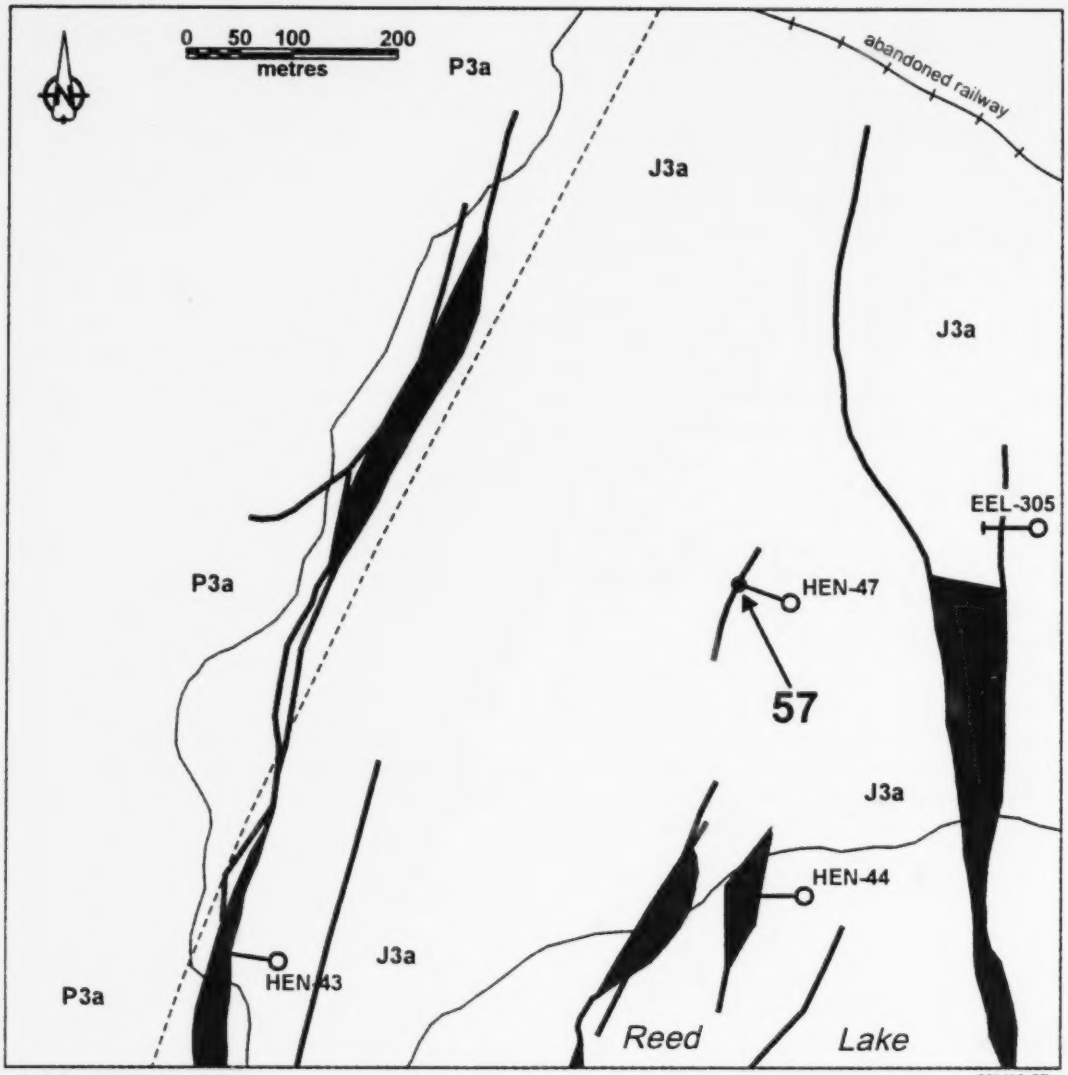


Figure 57-1: Geological setting of Occurrence 57.

LOCATION: 58

NAME: mineralization intersected by diamond drilling.
UTM: 387275 E, 6053360 N
AREA: under central part of Loucks Lake.
ACCESS: via boat along Grass River from Iskwasum Lake provincial campground.
AIRPHOTO: A26325-96

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708) for Parrex Syndicate. In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). In 1985 Granges Exploration Limited drilled several HLEM conductors under Loucks Lake (A.F. 92819).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 58-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic phyllonite, tectonite and mylonite (unit W6a) and felsic tectonite and mylonite (unit P11a) of the Loucks Lake shear zone, which is hosted by granodiorite and tonalite (units P7a and P7b) of the Gants Lake batholith (Syme, 1994).

Hole RAD-13 intersected quartz-chlorite schist and a slightly foliated, massive basalt (A.F. 92819).

MINERALIZATION

The sulphide mineralization intersected in hole RAD-13 is hosted by quartz-chlorite schist, and is summarized below (A.F. 92819).

Interval	Mineralization
58.5-59.5 m	10% pyrrhotite, 5% pyrite

GEOCHEMICAL DATA

One sampled interval from drillhole RAD-13 returned the following assay (A.F. 92819):

Interval	%Cu	%Zn	Au(g/t)	Ag(g/t)
58.5-59.5 m	0.03	0.01	0.10	0.05

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

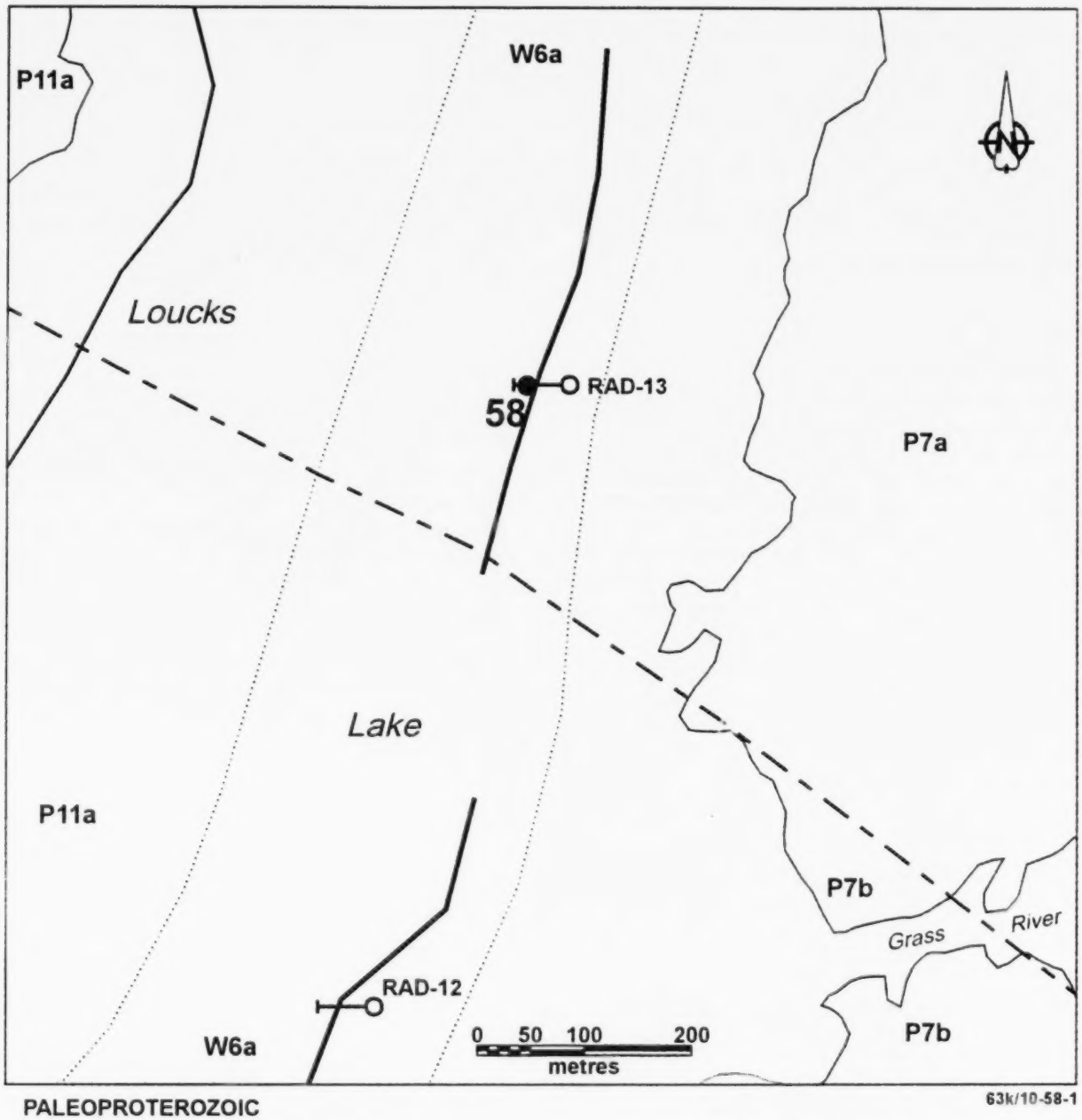
A.F. 91708, 91854, 92472 and 92819; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P11a — Felsic tectonite, mylonite
- P7a — Granodiorite
- P7b — Granodiorite to tonalite
- ..... Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- – – – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- ——— EM conductor (A.F. 92819)
- —O— Drillhole (A.F. 92819)
- 58● Mineral occurrence location

Figure 58-1: Geological setting of Occurrence 58.

LOCATION: 59

NAME: mineralization intersected by diamond drilling.
UTM: 403320 E 6065365 N
AREA: approximately 300 m N of Petersons Bay, Reed Lake.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1982 and 1983 (A.F. 92683). One hole, EEL-305, was drilled in 1983 to test a conductive response delineated by the ground EM survey (A.F. 92570).

GEOLOGICAL SETTING

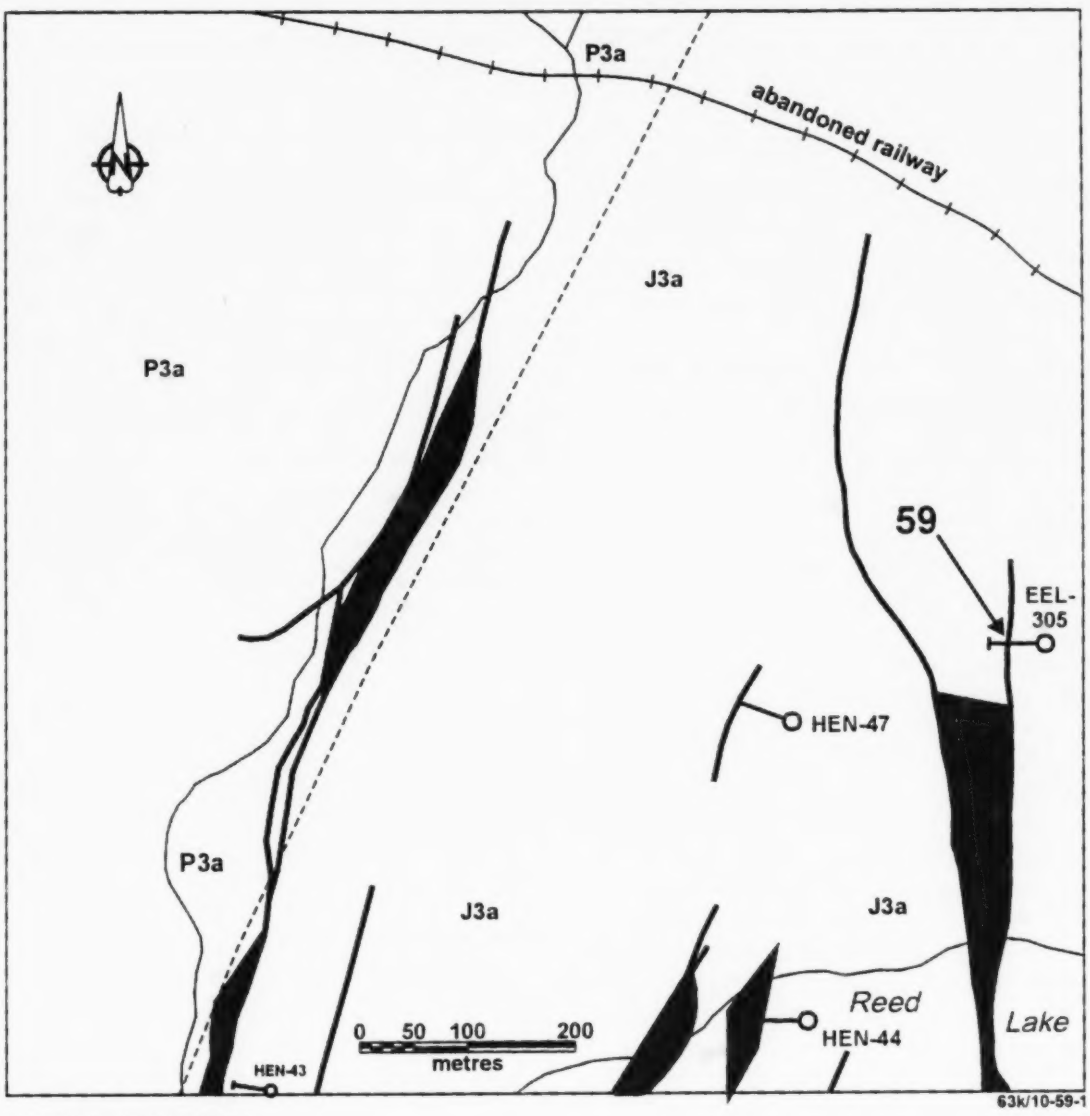
The geological unit designations indicated on the geological setting map (Fig. 59-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area. The mineralization occurs near the contact of the two main units.

The sequence intersected by hole EEL-305 consists of laminated, fine grained dacitic to rhyolitic tuff, tuff breccia, tuffaceous greywacke and variably graphitic argillite, with lesser massive rhyolite and dacite (A.F. 92570). Garnet is locally present.

MINERALIZATION

Much of the sequence intersected by hole EEL-305 contains low quantities (3% or less) of disseminated sulphides (pyrrhotite and pyrite) throughout the arenaceous and felsic metavolcanic rocks (A.F. 92570). The character of the mineralization is not well described, but appears to be dominantly disseminated. The thicker mineralized intervals intersected in hole EEL-305 are summarized below (see table).

Interval	Mineralization
179.8-180.0 ft. (54.8-54.9 m)	5-8% pyrite as stringers
219.6-220.1 ft. (66.9-67.1 m)	7-8% pyrrhotite as stringers
259.3-261.0 ft. (79.0-79.6 m)	20% pyrrhotite, stringers and disseminations
316.6-317.7 ft. (96.5-96.8 m)	20-25% pyrrhotite, 3% pyrite, trace sphalerite
318.0-325.0 ft. (96.9-99.1 m)	3-25% pyrrhotite, 3% pyrite, to 10% graphite
327.0-337.0 ft. (99.7-102.7 m)	5-70% pyrrhotite, to 10% pyrite, to 10% graphite
405.0-406.3 ft. (123.4-123.8 m)	7-9% pyrrhotite, 5% graphite
407.0-407.7 ft. (124.1-124.3 m)	5% pyrrhotite
408.5-409.1 ft. (124.5-124.7 m)	25-30% pyrrhotite, trace chalcopyrite
546.8-547.4 ft. (166.7-166.8 m)	5% pyrrhotite as stringers
608.6-609.7 ft. (185.5-185.8 m)	7-8% pyrrhotite
613.0-613.6 ft. (186.8-187.0 m)	7% pyrrhotite, 2% pyrite, trace chalcopyrite
618.8-620.0 ft. (188.6-189.0 m)	30% pyrrhotite, trace to 1% pyrite
625.5-627.5 ft. (190.7-191.3 m)	30-35% pyrrhotite
630.4-632.2 ft. (192.1-192.7 m)	10% pyrrhotite, 1% pyrite, as stringers
638.0 ft. (194.5 m)	70% pyrrhotite, 30% pyrite, in quartz vein
655.5-656.1 ft. (199.6-200.0 m)	3-5% pyrrhotite
668.0-669.3 ft. (203.6-204.0 m)	3-5% pyrrhotite, trace to 1% pyrite
681.0-685.7 ft. (207.6-209.0 m)	5-65% pyrrhotite
686.4-688.3 ft. (209.2-209.8 m)	5-20% pyrrhotite, trace chalcopyrite
701.6-702.6 ft. (213.8-214.2 m)	5-6% pyrrhotite
703.6-712.5 ft. (214.5-217.2 m)	5-9% pyrrhotite
713.8-721.4 ft. (217.6-219.9 m)	20-60% pyrrhotite, trace chalcopyrite
725.3-728.6 ft. (221.1-222.1 m)	1-5% pyrrhotite
730.0-730.8 ft. (222.5-222.7 m)	3-5% pyrrhotite



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

----- Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 92683)

Drillhole (A.F. 92570)

59 Mineral occurrence location

Figure 59-1: Geological setting of Occurrence 59.

GEOCHEMICAL DATA

The mineralized intervals in hole EEL-305 were extensively sampled, but values were returned only from the intervals indicated below (A.F. 92570):

Interval	%Cu	%Zn
186.4-187.3 ft. (56.8-57.1 m)		0.2
208.6-209.4 ft. (63.6-63.8 m)		0.5
210.9-211.4 ft. (64.3-64.4 m)		0.2
254.9-255.4 ft. (77.7-77.8 m)		0.1
316.6-317.7 ft. (96.5-96.8 m)		0.2
323.5-325.0 ft. (98.6-99.1 m)		0.1
484.0-484.5 ft. (147.5-147.7 m)		0.1
630.4-632.2 ft. (192.1-192.7 m)		0.1
677.8-678.4 ft. (206.6-206.8 m)		0.1
688.7-690.3 ft. (209.9-210.4 m)		0.1
701.6-702.6 ft. (213.8-214.2 m)		0.1
713.8-715.8 ft. (217.6-218.2 m)		0.2
715.8-717.1 ft. (218.2-218.6 m)	0.1	0.2

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 90250, 91619, 92352, 92570 and 92683; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 60

NAME: mineralization intersected by diamond drilling.
UTM: 402715 E 6064585 N
AREA: along west side of Petersons Bay, north side of Reed Lake.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 60-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area.

The sequence intersected by hole HEN-42 is dominated by a felsic metavolcanic lithology ("dacite") with minor chloritic "andesite" (A.F. 90250).

MINERALIZATION

In hole HEN-42, pyrrhotite with lesser pyrite occurs over several narrow intervals within the felsic metavolcanic rock, as summarized below (A.F. 90250) (see table).

Interval	Mineralization
160.3-161.0 ft. (48.9-49.1 m)	pyrrhotite
162.1-163.3 ft. (49.4-49.8 m)	pyrite
218.0-219.6 ft. (66.4-66.9 m)	pyrrhotite
233.6-239.1 ft. (71.2-72.9 m)	well mineralized to near solid pyrite, pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

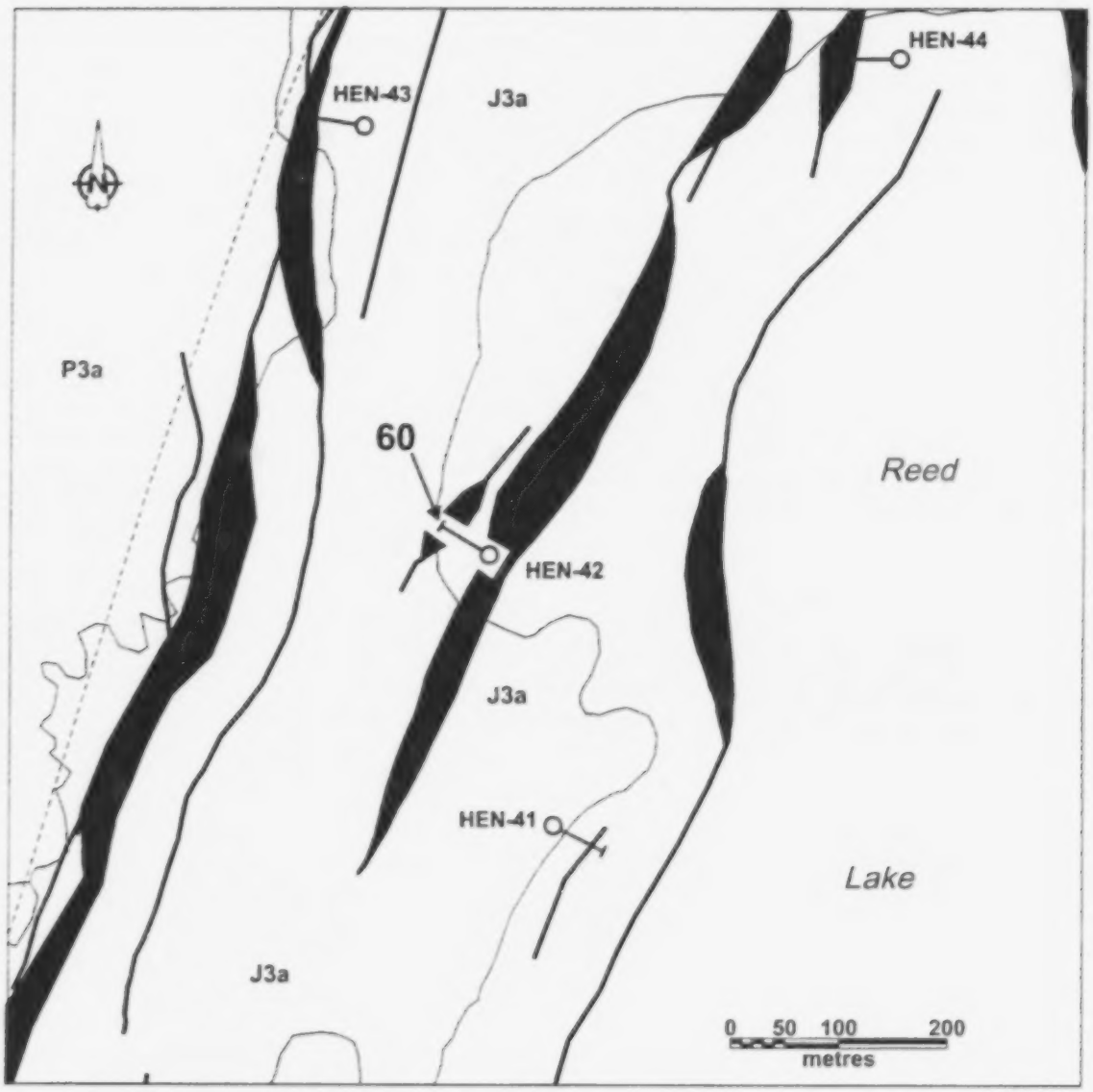
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate) - NATMAP Shield Margin Progect Working Group, 1998

EM conductor (A.F. 90250, 92683)

Drillhole (A.F. 90250)

60 Mineral occurrence location

Figure 60-1: Geological setting of Occurrence 60.

LOCATION: 61

NAME: mineralization intersected by diamond drilling.
UTM: 402280 E 6064055 N
AREA: at head of bay SSW of Petersons Bay, north side of Reed Lake.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 61-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area. The mineralization occurs near the contact of the two major units.

The sequence intersected by hole HEN-40 is dominated by mafic to intermediate ("andesite" and "dacite") metavolcanic lithologies with lesser felsic (rhyolite?) rock types and diorite (A.F. 90250).

MINERALIZATION

The mineralization intersected in hole HEN-40 is hosted by "dacite" with intercalated "trachytic" units, with the highest sulphide (pyrrhotite and pyrite) contents occurring over the following intervals (A.F. 90250):

Interval	Mineralization
183.0-185.5 ft. (55.8-56.5 m)	well mineralized with pyrite, bornite (?)
192.0-195.2 ft. (58.5-59.5 m)	well mineralized with pyrite and pyrrhotite
198.6-229.5 ft. (60.5-70.0 m)	well mineralized with pyrite and pyrrhotite, trace chalcopyrite
233.7-241.1 ft. (71.2-73.5 m)	well mineralized with pyrite and pyrrhotite, graphite
242.7-247.3 ft. (74.0-75.4 m)	well mineralized with pyrrhotite and pyrite
264.4-265.8 ft. (80.6-81.0 m)	near solid pyrrhotite, graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

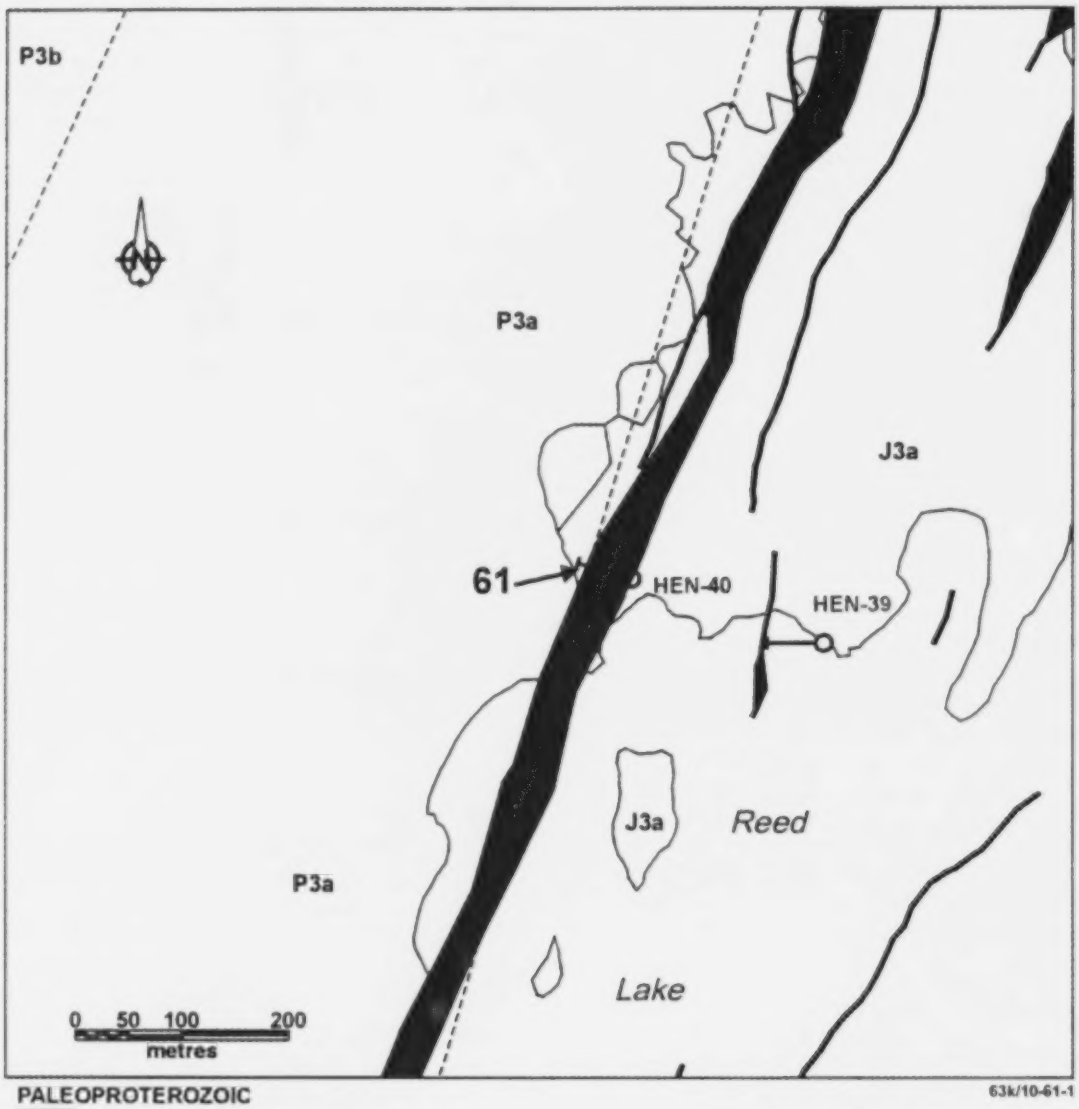


Figure 61-1: Geological setting of Occurrence 61.

LOCATION: 62

NAME: mineralization intersected by diamond drilling.
UTM: 402425 E 6063990 N
AREA: approximately 600 m SSW of Petersons Bay, north side of Reed Lake.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 62-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area.

The sequence intersected by hole HEN-39 is dominated by fine grained, mafic to intermediate ("andesite" and "dacite") metavolcanic lithologies (A.F. 90250).

MINERALIZATION

The mineralization intersected in hole HEN-39 is hosted by "dacite", with the highest sulphide (pyrrhotite and pyrite) contents occurring over the following intervals (A.F. 90250):

Interval	Mineralization
217.0-218.7 ft. (66.1-66.7 m)	well mineralized with pyrrhotite, lesser pyrite
225.3-256.6 ft. (68.7-78.2 m)	slightly to well mineralized with pyrite, lesser pyrrhotite, tr sphalerite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

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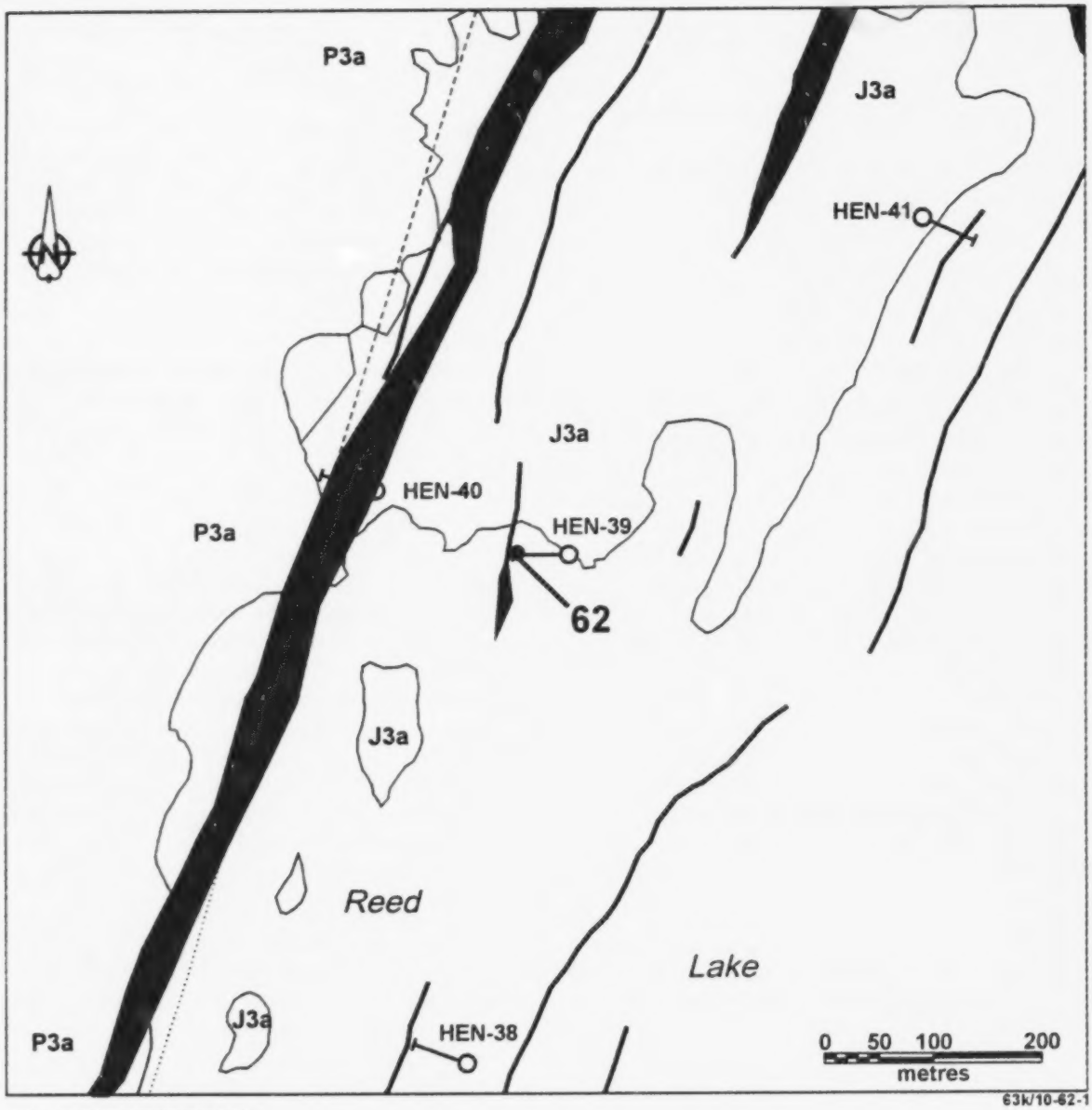
Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 92683)

Drillhole (A.F. 90250)

62 Mineral occurrence location

Figure 62-1: Geological setting of Occurrence 62.

LOCATION: 63

NAME: mineralization intersected by diamond drilling.
UTM: 402850 E 6064290 E
AREA: at western mouth of Petersons Bay, north side of Reed Lake.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-157

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 63-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area.

The sequence intersected by hole HEN-41 consists of fine grained, quartz-phyric "trachyte", graphite schist, volcaniclastic breccia, and "dacitic" metavolcanic lithologies (A.F. 90250).

MINERALIZATION

Unspecified amounts of pyrite occur in graphite schist in hole HEN-41 over the following intervals (A.F. 90250):

Interval
120.2-173.8 ft. (36.6-53.0 m)
217.0-312.8 ft. (66.1-95.3 m)

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

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Syme, E.C., Bailes, A.H. and Lucas, S.B.

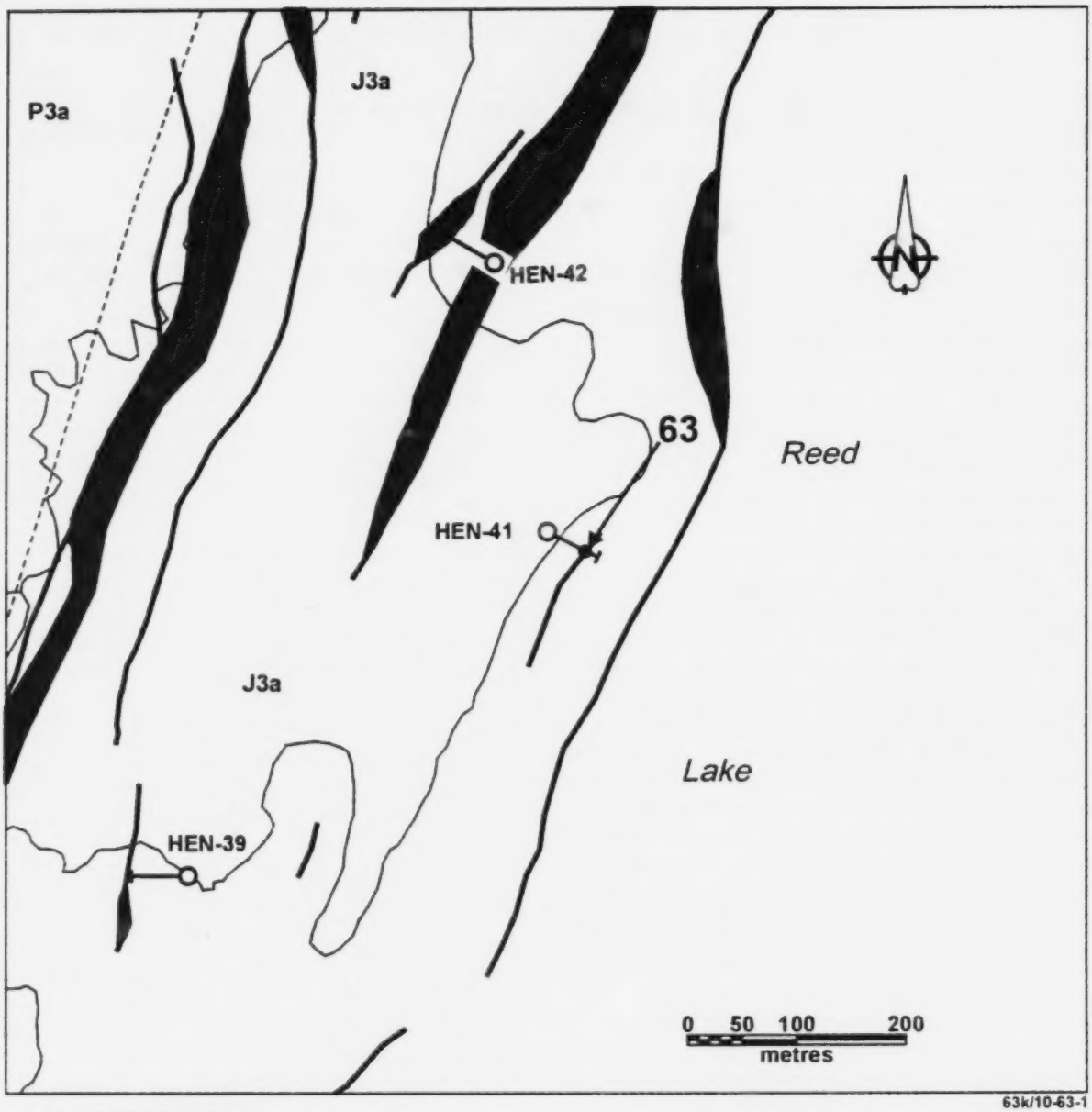
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

------ Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 92683)

Drillhole (A.F. 90250)

63• Mineral occurrence location

Figure 63-1: Geological setting of Occurrence 63.

LOCATION: 64

NAME: mineralization intersected by diamond drilling.

UTM: 402330 E 6063545 N

AREA: under Reed Lake between Kennedy Island (unofficial name) and Petersons Bay, north side of Reed Lake.

ACCESS: via boat from Reed Lake provincial campground.

AIRPHOTO: A26367-156

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1974 an airborne INPUT and magnetic survey was carried out for Gränges Exploration AB (A.F. 92352). Hudson Bay Exploration and Development Company, Limited carried out a ground EM (MaxMin II) survey in 1983 (A.F. 92683).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 64-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks, also underlies the area.

The sequence intersected by hole HEN-38 consists of fine grained, light blue-grey "dacite" and "rhyolite" with fragmental intervals, graphite schist, and minor medium grained, massive dioritic units (A.F. 90250).

MINERALIZATION

The first and thickest mineralized interval is hosted by graphitic schist. The remaining intervals occur in a "fragmented siliceous zone" (A.F. 90250) that may be a felsic volcaniclastic interval. The mineralization in hole HEN-38 is summarized as follows (see table).

Interval	Mineralization
243.3-255.3 ft. (74.2-77.8 m)	pyrite and pyrrhotite, trace chalcopyrite in graphite schist
261.8-262.7 ft. (79.8-80.1 m)	well mineralized with pyrite and pyrrhotite
264.1-264.5 ft. (80.5-80.6 m)	well mineralized with pyrite and pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 90250, 91619, 92352 and 92683; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

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1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

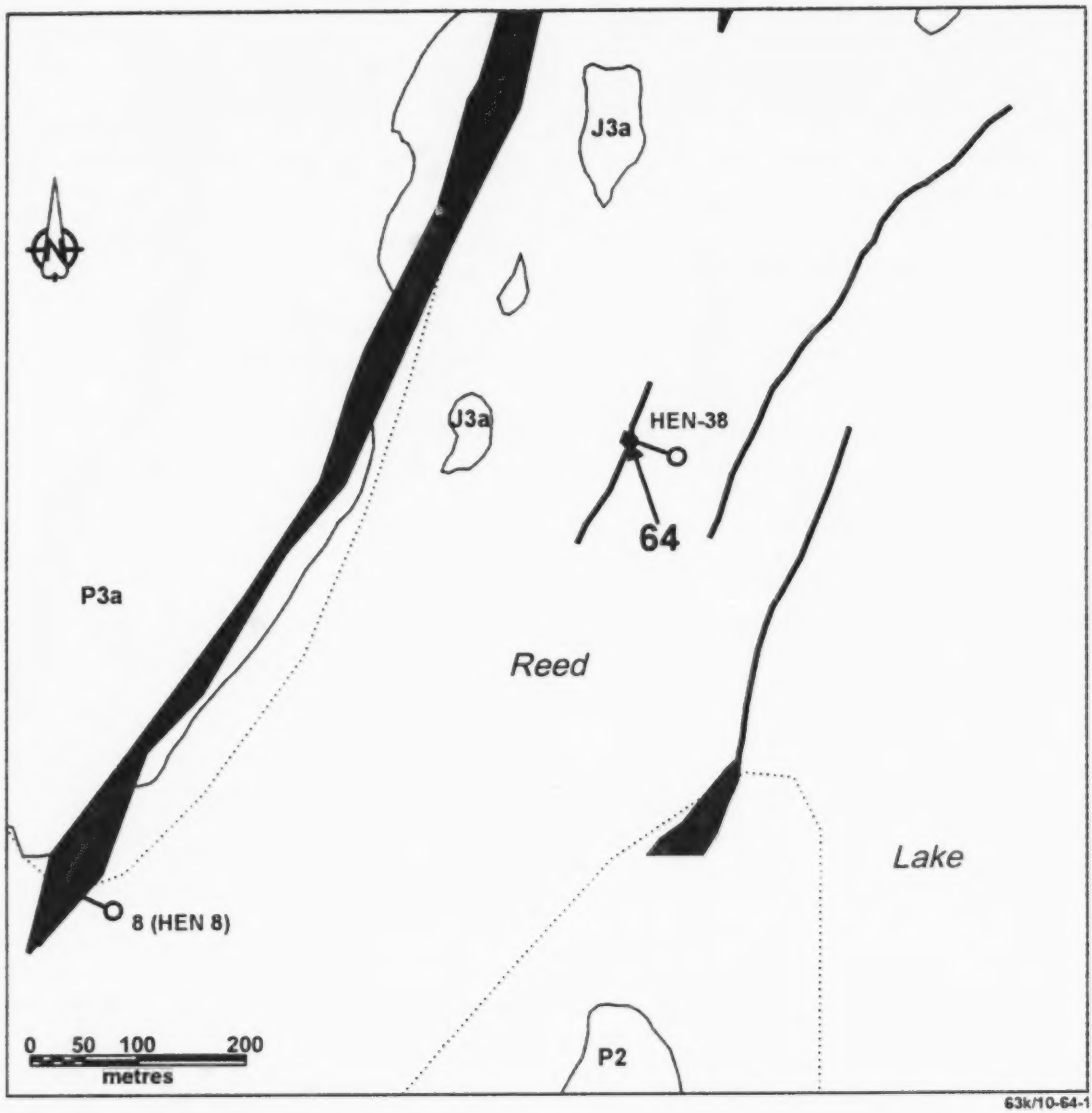
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

..... Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 92683)

Drillhole (A.F. 90250)

64 ● Mineral occurrence location

Figure 64-1: Geological setting of Occurrence 64.

LOCATION: 65

NAME: mineralization intersected by diamond drilling.
UTM: 392325 E 6060395 N
AREA: approximately 400 m west of Radar Lake (unofficial name).
ACCESS: via bush aircraft to Radar Lake, then traverse.
AIRPHOTO: A26365-10

EXPLORATION SUMMARY

In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263). A ground magnetometer survey was performed over the occurrence by Hudson Bay Exploration and Development Company, Limited in 1984 (A.F. 92733), who tested an HLEM (MaxMin II) conductor with a single hole in 1985 (A.F. 92641).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 65-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that comprise the Flag Lake strand of the West Reed-North Star shear zone (Syme *et al.*, 1995). Gabbro and diorite (unit P2a) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993) occur to the east, and granodiorite (unit P7a) of the Gants Lake batholith (Morrison and Whalen, 1995) to the west of the occurrence.

A variety of rock types were intersected by hole EEL-322 including biotite, quartz-feldspar and quartz-biotite gneiss, feldspar-quartz porphyry and massive dioritic units (A.F. 92641).

MINERALIZATION

The mineralization in this hole occurs at the upper and lower contacts of a foliated quartz-feldspar porphyry (A.F. 92641). Similar felsic units in the hole are cherty and show a banded appearance. The mineralized intervals intersected in hole EEL-322 are summarized below:

Interval	Mineralization
213.3-217.8 ft. (65.0-66.4 m)	1-5% pyrite as stringers
224.1-225.2 ft. (68.3-68.6 m)	20-30% pyrite

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals in hole EEL-322 (A.F. 92641):

Interval	%Cu	%Zn
216.5-217.8 ft. (66.0-66.4 m)	0.06	0.1
222.5-224.1 ft. (67.8-68.3 m)	——	0.1
224.1-225.2 ft. (68.3-68.6 m)	0.08	—

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 90263, 92641 and 92733; Cancelled Assessment Files, Manitoba Energy and Mines, Minerals Division.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; **in** Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1992: Reed Lake Gabbro project; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.

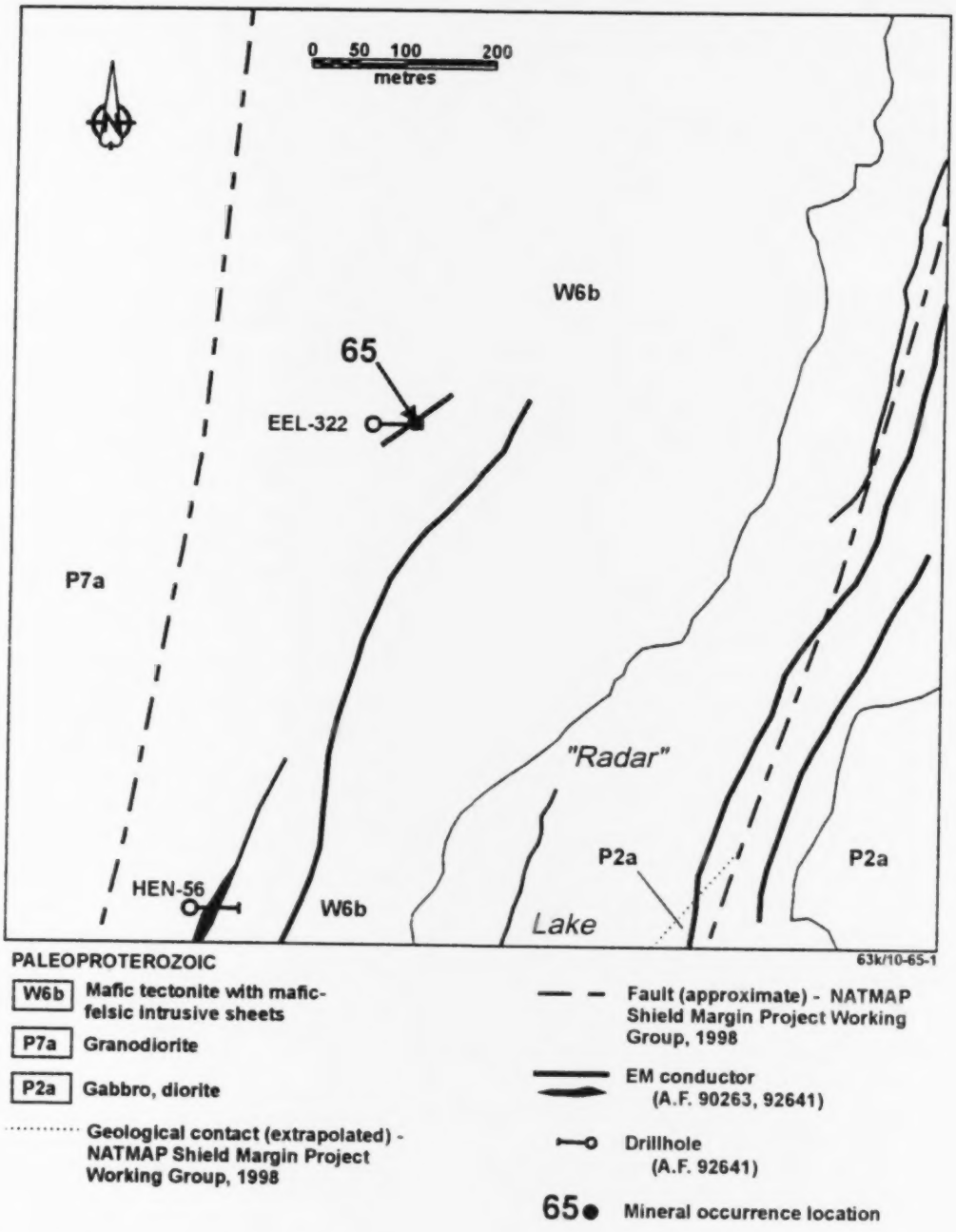


Figure 65-1: Geological setting of Occurrence 65.

LOCATION: 66

NAME: mineralization intersected by diamond drilling.
UTM: 392120 E 6059875 N
AREA: approximately 200 m west of south end of Radar Lake (unofficial name).
ACCESS: via bush aircraft to Radar Lake, then traverse.
AIRPHOTO: A26365-9

EXPLORATION SUMMARY

Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263). A ground magnetometer survey was performed over the occurrence by Hudson Bay Exploration and Development Company, Limited in 1984 (A.F. 92733).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 66-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that comprise the Flag Lake strand of the West Reed-North Star shear zone (Syme *et al.*, 1995). Gabbro and diorite (unit P2a) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993) occurs to the east, and granodiorite (unit P7a) of the Gants Lake batholith (Morrison and Whalen, 1995) occurs to the west of the occurrence.

Hole HEN-56 intersected a sequence of hornblende-plagioclase and quartz-biotite-chlorite gneisses with intervals of fine grained, laminated ("tuff") rocks (A.F. 90250). The foliated character of the sequence is probably related to the West Reed-North Star shear zone rather than a primary depositional feature.

MINERALIZATION

Sulphide mineralization was intersected in hole HEN-56 in hornblende-plagioclase gneiss over the following interval (A.F. 90250) (see table).

Interval	Mineralization
200.2-203.9 ft. (61.0-62.1 m)	well mineralized with pyrrhotite, trace chalcopyrite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 90250, 90263 and 92733; Cancelled Assessment Files, Manitoba Energy and Mines, Minerals Division.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; **in** Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

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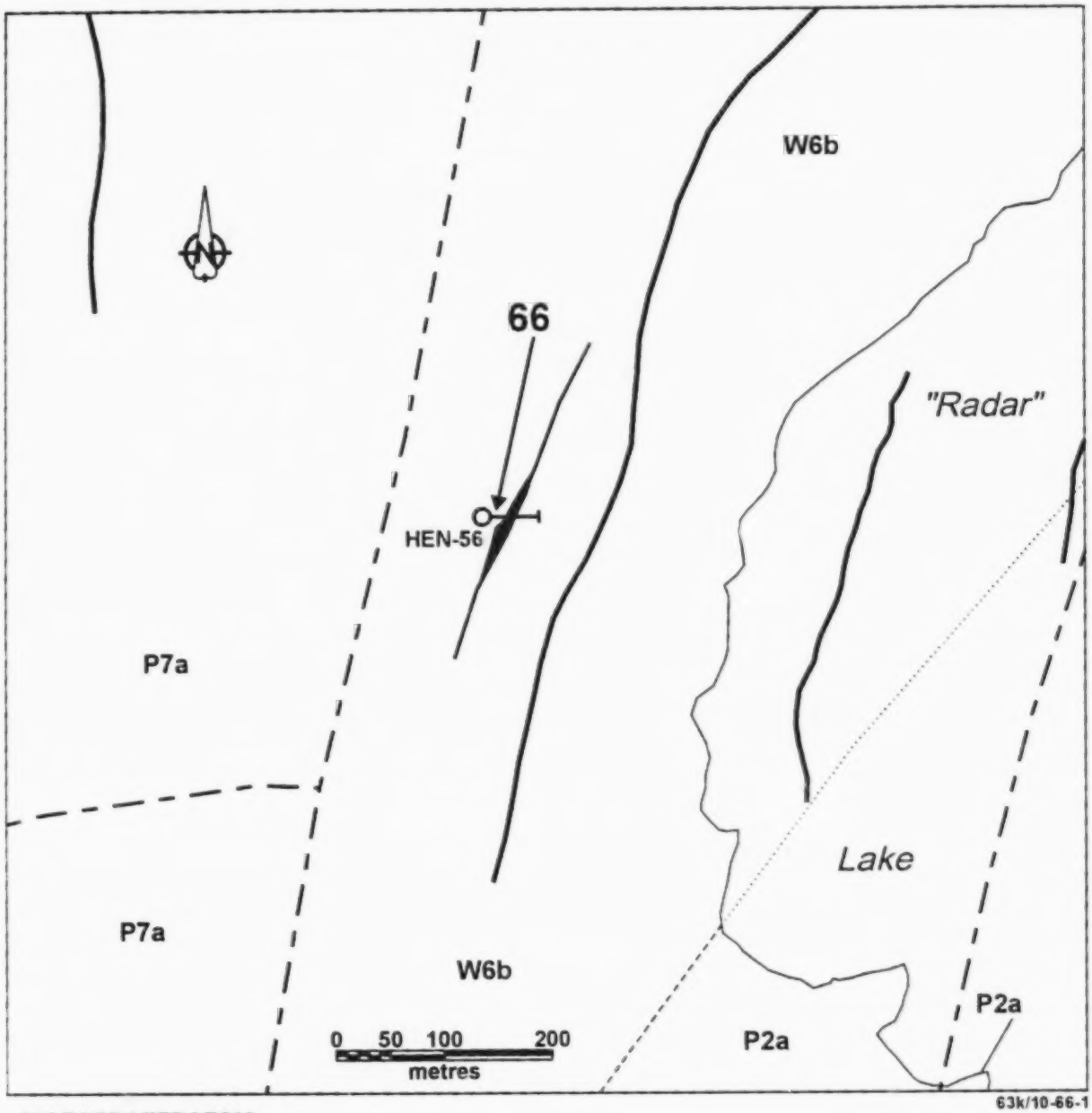
1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.



PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

P7a Granodiorite

P2a Gabbro, diorite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250, 90263)

Drillhole (A.F. 90250)

66 Mineral occurrence location

Figure 66-1: Geological setting of Occurrence 66.

LOCATION: 67

NAME: mineralization intersected by diamond drilling.

UTM: 391665 E 6058625 N

AREA: on NW side of small lake approximately 2.1 km SW of Radar Lake (unofficial name).

ACCESS: via bush aircraft to Radar Lake, then traverse.

AIRPHOTO: A26368-8

EXPLORATION SUMMARY

Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263, 90264).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 67-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that comprise the Flag Lake strand of the West Reed-North Star shear zone (Syme *et al.*, 1995). Gabbro and diorite (unit P2a), layered gabbro, leucogabbro and anorthosite (unit F6c) and layered pyroxenite, peridotite and subordinate gabbro (unit F6d) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993) occur to the east and SE, and granodiorite (unit P7a) of the Gants Lake batholith (Morrison and Whalen, 1995) to the NW of the occurrence.

Hole HEN-62 intersected a series of quartz-hornblende-feldspar and hornblende-biotite gneisses (A.F. 90250).

MINERALIZATION

Sulphide mineralization was intersected in hole HEN-62 over the following interval (A.F. 90250) (see table).

Interval	Mineralization
122.4-128.2 ft. (37.3-39.1 m)	near solid pyrrhotite, slight pyrite, trace chalcopyrite and sphalerite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Disseminated mineralization - not classified. Rock descriptions are unclear in the drillhole litholog.

REFERENCES

A.F. 90250, 90263 and 90264; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

Morrison, D.W. and Whalen, J.B.

1995: Granitoid plutons and major structures in the Iskwasum Lake sheet, Manitoba: a portion of the Flin Flon Domain of the Trans Hudson Orogen; **in** Current Research 1995-C, Geological Survey of Canada, p. 225-234.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

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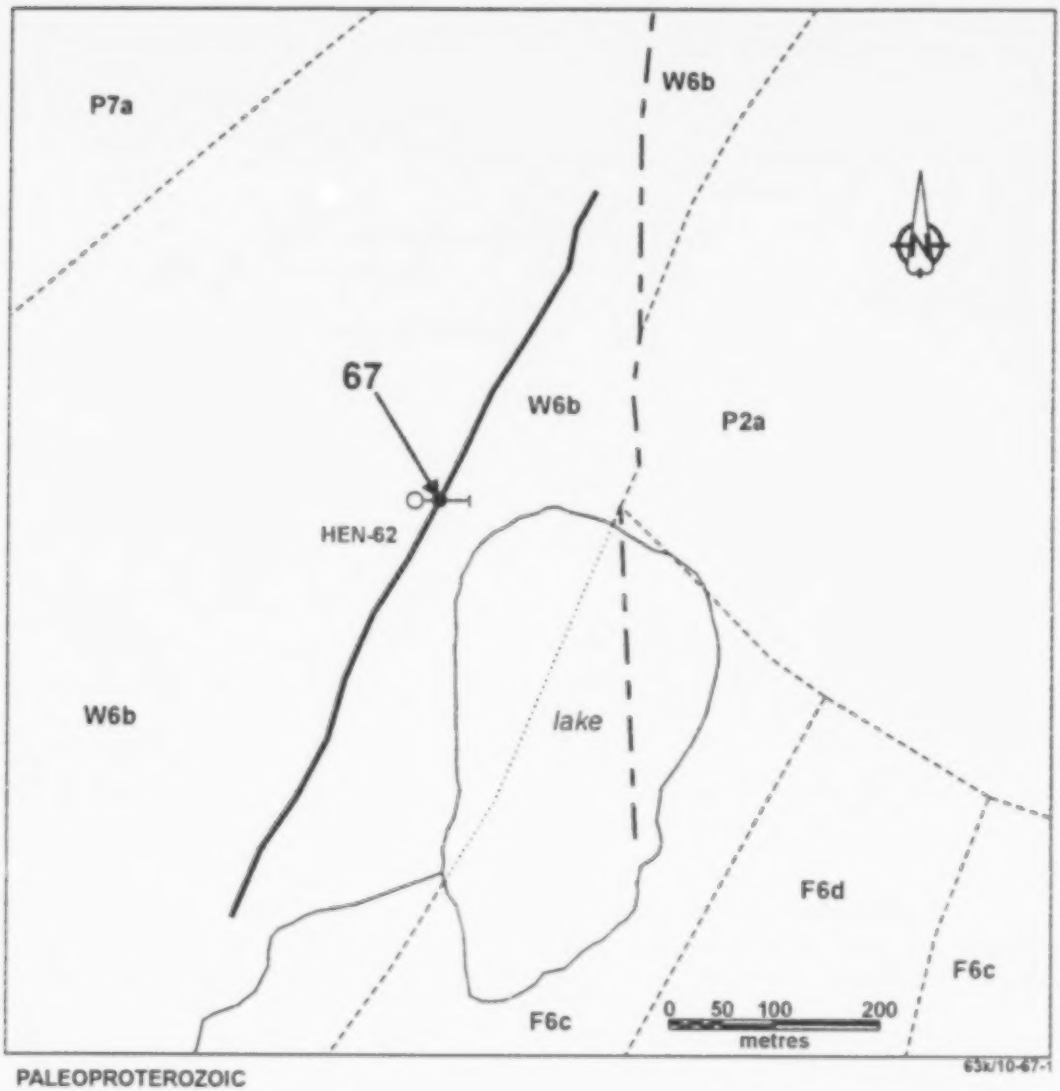
1992: Reed Lake Gabbro project; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.



PALEOPROTEROZOIC

- W6b — Mafic tectonite with mafic-felsic intrusive sheets
- P7a — Granodiorite
- P2a — Gabbro, diorite
- F6c — Layered gabbro, leucogabbro, anorthosite
- F6d — Layered pyroxenite, peridotite, subordinate gabbro

- Geological contact (approximate, extrapolated) .- NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate,.- NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 90250, 90263, 90264)
- Drillhole (A.F. 90250)
- 67 Mineral occurrence location

Figure 67-1: Geological setting of Occurrence 67.

LOCATION: 68

NAME: mineralization intersected by diamond drilling.
UTM: 397800 E 6059895 N
AREA: at head of small bay on Reed Lake, approximately 3.9 km SSW of south end of Krug Lake.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26365-202

EXPLORATION SUMMARY

In 1948 several holes were drilled on claim G.A.L. #8 (M.C. 9018) (A.F. 90267). The target for these holes was not indicated in the assessment file. In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Hudson Bay Exploration and Development Company, Limited performed EM (Turam and EM-17) surveys over the area in 1972 (A.F. 91856).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 68-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that comprise the Reed Lake strand of the West Reed-North Star shear zone (Syme *et al.*, 1995). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) underlies the eastern part of the area. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

The drillholes intersected a sequence of fine grained mafic rocks ("greenstone") and minor quartz-feldspar porphyry (A.F. 90267).

MINERALIZATION

The mineralization is hosted by mafic rock ("greenstone"), and is summarized below (A.F. 90267) (see table).

Interval	Mineralization
hole 12 70.0-75.0 ft. (21.3-22.9 m)	near solid pyrite
hole 13 80.0-83.0 ft. (24.4-25.3 m)	near solid pyrite
hole 14 70.0-73.0 ft. (21.3-22.3 m)	near solid pyrite

GEOCHEMICAL DATA

No assays were reported for these holes.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90267, 91619, 91661 and 91856; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

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Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

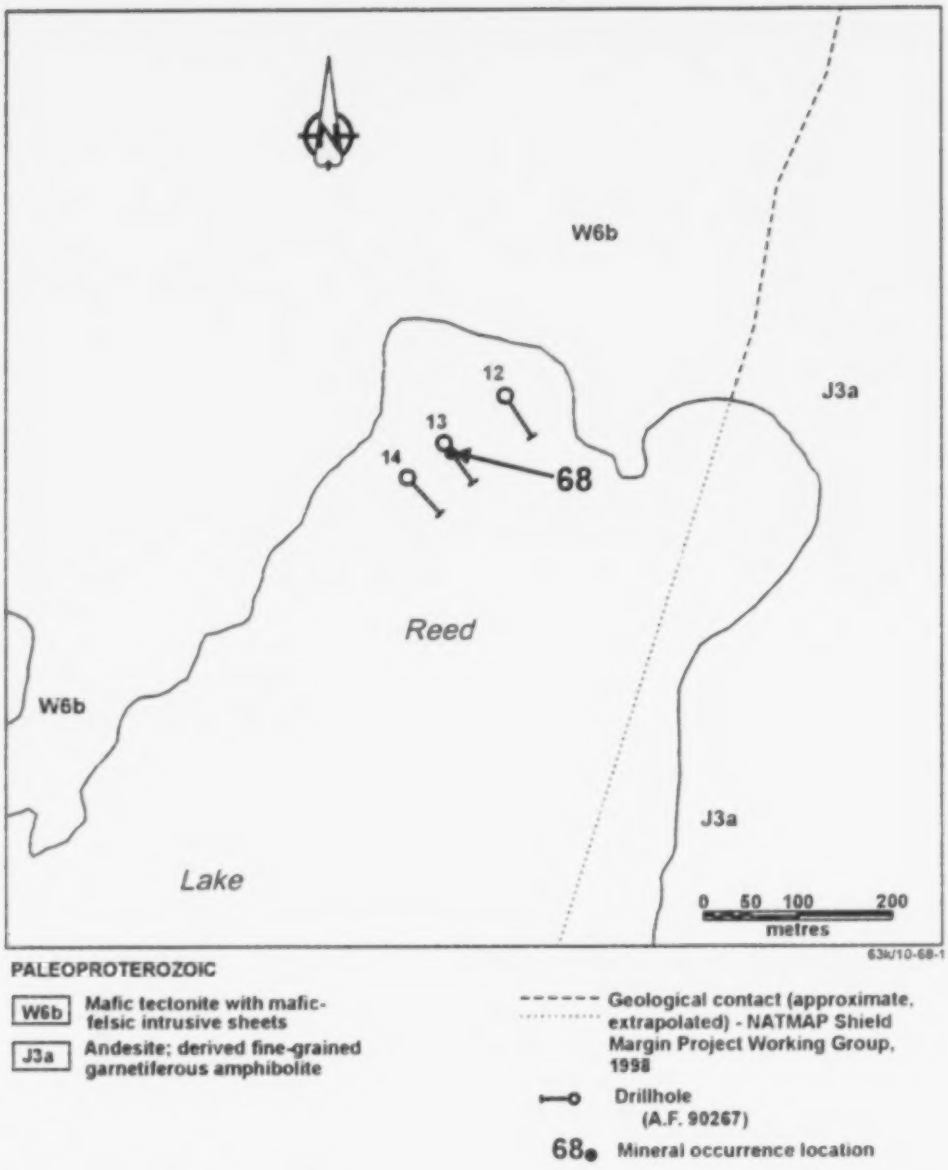


Figure 68-1: Geological setting of Occurrence 68.

LOCATION: 69

NAME: mineralization intersected by diamond drilling.
UTM: 398445 E 6060175 N
AREA: approximately 1.4 km SSW of south end of Krug Lake.
ACCESS: via boat from Reed Lake provincial campground, then traverse.
AIRPHOTO: A26365-202

EXPLORATION SUMMARY

In 1948 several holes were drilled on claim G.A.L. #9 (M.C. 9019) (A.F. 90267). The target for these holes was not indicated in the assessment file. In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). Hudson Bay Exploration and Development Company, Limited performed EM (Turam and EM-17) surveys over the area in 1972 (A.F. 91856).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 69-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that comprise the Reed Lake strand of the West Reed-North Star shear zone (Syme *et al.*, 1995) underlies the western part of the area, and gabbronorite and gabbro (unit P3a) occur to the east. The latter unit is probably a member of the Josland Lake gabbro (Bailes, 1980), a series of differentiated gabbro sills intercalated with felsic and mafic metavolcanic and epiclastic metasedimentary rocks.

The drillholes intersected gabbro and quartz porphyry (A.F. 90267).

MINERALIZATION

The mineralization is located at the contact of gabbro with slightly mineralized quartz porphyry, and is summarized below (A.F. 90267) (see table).

Interval	Mineralization
hole 15 86.0-93.0 ft. (26.2-28.3 m)	near solid pyrite
hole 16 79.0-87.0 ft. (24.1-26.5 m)	near solid pyrite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 90267, 91619 and 91856; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Bailes, A.H.

1980: Geology of the File Lake Area; Manitoba Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

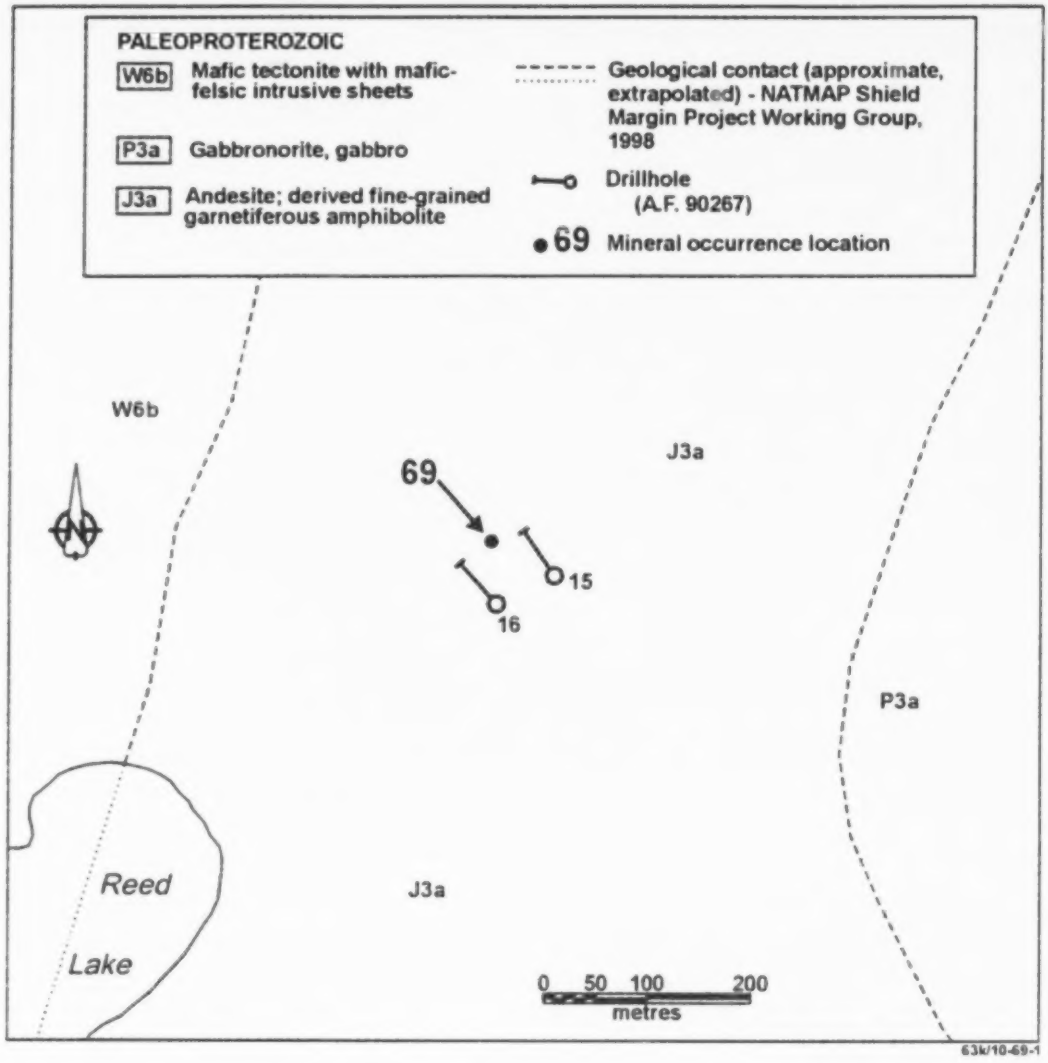


Figure 69-1: Geological setting of Occurrence 69.

LOCATION: 70

NAME: mineralization intersected by diamond drilling.
UTM: 400550 E, 6060640 N
AREA: under Reed Lake approximately 0.9 km west of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-20

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1971 an HLEM (Turam) survey was performed for Straus Exploration Inc. (A.F. 92737). In 1972, Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736). Hudson Bay Exploration and Development Company, Limited performed an HLEM (MaxMin II) survey over the occurrence in 1982 (A.F. 92738).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 70-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbro, diorite, quartz diorite and derived amphibolite (unit P2) occur to the east.

Diamond drillhole 3 intersected a sequence of felsic metavolcanic rocks (dacite to rhyolite) containing graphitic intervals, and fine grained, massive diorite (A.F. 92736).

MINERALIZATION

The litholog indicates that the sulphide mineralization is associated with the felsic metavolcanic intervals, and usually has associated graphite (A.F. 92736). The mineralized intervals in hole 3 are summarized below:

Interval	Mineralization
126.0-132.5 ft. (38.4-40.4 m)	10% pyrite
132.5-141.0 ft. (40.4-43.0 m)	to 10% disseminated pyrite
141.0-223.5 ft. (43.0-68.1 m)	to 20% pyrite, minor graphite
229.5-258.5 ft. (70.0-78.8 m)	to 20% pyrite, graphite
258.5-273.0 ft. (78.8-83.2 m)	5-10% pyrite and pyrrhotite
273.0-315.0 ft. (83.2-96.0 m)	pyrite and graphite
320.0-325.0 ft. (97.5-99.1 m)	pyrite and graphite

GEOCHEMICAL DATA

The following assays were obtained for the sulphide rich intervals intersected in drillhole 3 (A.F. 92736):

Interval	%Cu	%Zn	%Ni
151.0-161.0 ft. (46.0-49.1 m)	0.02	tr	0.02
277.5-287.5 ft. (84.6-87.6 m)	0.02	tr	——

Assays for Au and Ag returned up to trace amounts of these metals. Other sampled intervals returned up to trace quantities of Cu, Zn, Ni and Co (A.F. 92736).

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661, 92736, 92737 and 92738; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

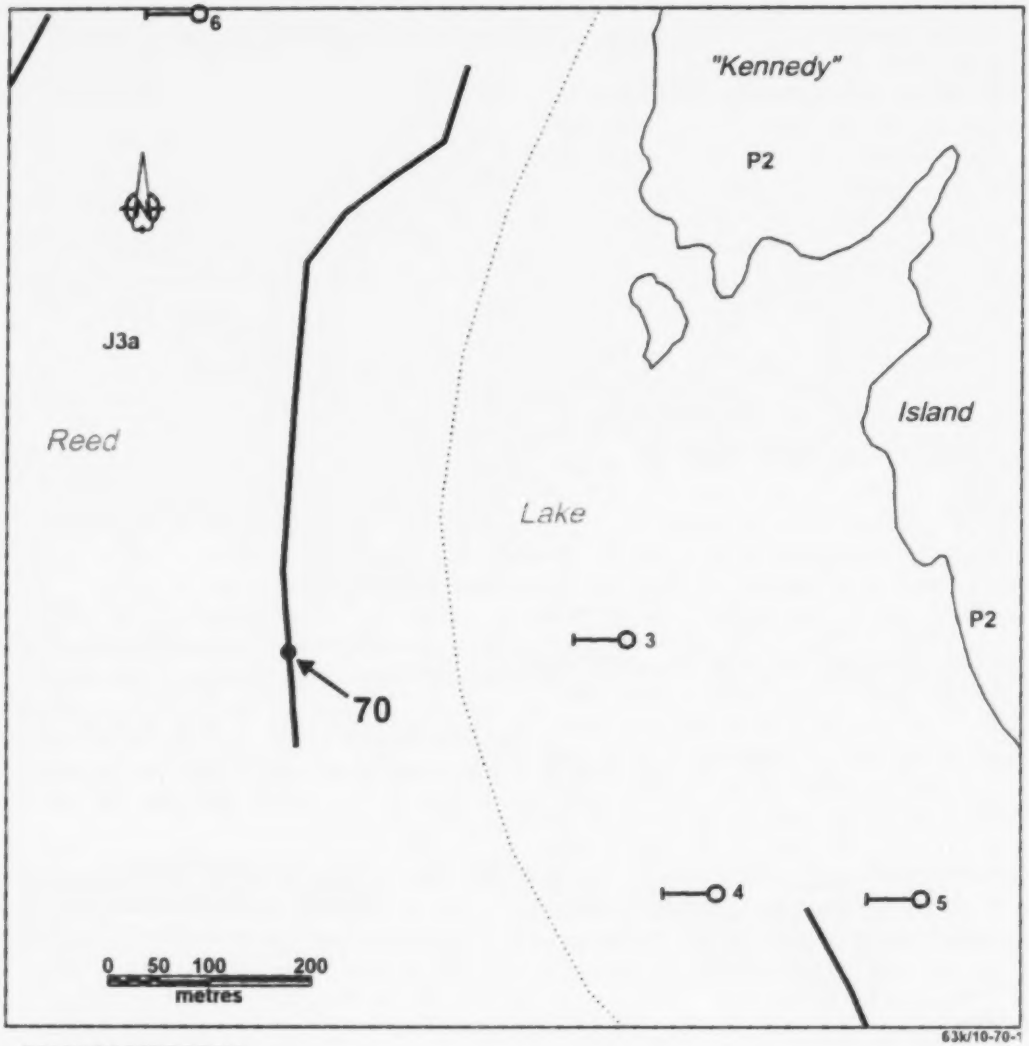
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

..... Geological contact (approximate, extrapolated), - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92737, 92738)

Drillhole (A.F. 92736)

70 Mineral occurrence location

Figure 70-1: Geological setting of Occurrence 70.

LOCATION: 71

NAME: mineralization intersected by diamond drilling.
UTM: 401060 E 6060390 N
AREA: under Reed Lake approximately 0.3 km west of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-20

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1971 an HLEM (Turam) survey was performed for Straus Exploration Inc. (A.F. 92737). In 1972, Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736). Hudson Bay Exploration and Development Company, Limited performed an HLEM (MaxMin II) survey over the occurrence in 1982 (A.F. 92738).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 71-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occur in the east, west and south of the area. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

Holes 4 and 5 intersected a sequence of felsic metavolcanic rocks (dacite to rhyolite, "felsite") containing graphitic intervals, and fine to medium grained, massive diorite (A.F. 92736). The litholog for hole 5 indicates the presence of graphitic schist and argillite, and siliceous quartz-feldspar porphyry containing minor disseminated pyrite.

MINERALIZATION

Sulphide mineralization in drillhole 4 is associated with quartz-feldspar porphyry. The main mineralized intervals in hole 5 are hosted by graphitic schist. The mineralized intervals are summarized below:

Interval	Mineralization
hole 4	
170.0-174.0 ft. (51.8-53.0 m)	5% pyrite
181.5-182.5 ft. (55.3-55.6 m)	8-10% pyrite
190.0-191.0 ft. (57.9-58.2 m)	8-10% pyrite
hole 5	
285.0-351.0 ft. (86.9-107.0 m)	15-20% pyrite, graphite
375.0-381.0 ft. (114.3-116.1 m)	20% pyrite, graphite
464.5-473.8 ft. (141.6-144.4 m)	near solid earthy pyrite

GEOCHEMICAL DATA

Assays from holes 4 and 5 returned no Au or Ag values (A.F. 92736). Intervals that returned values are summarized below (A.F. 92736).

Interval	%Cu	%Zn	%Ni
hole 5			
302.0-312.0 ft. (92.0-95.1 m)	0.02	tr	—
351.0-356.0 ft. (107.0-108.5 m)	tr	nil	0.03
356.0-362.0 ft. (108.5-110.3 m)	tr	nil	0.02
465.0-474.0 ft. (141.7-144.5 m)	0.04	tr	0.02
492.0-502.0 ft. (150.0-153.0 m)	0.02	—	tr
512.0-522.0 ft. (156.1-159.1 m)	0.01	—	tr
522.0-532.0 ft. (159.1-162.2 m)	0.02	—	tr

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

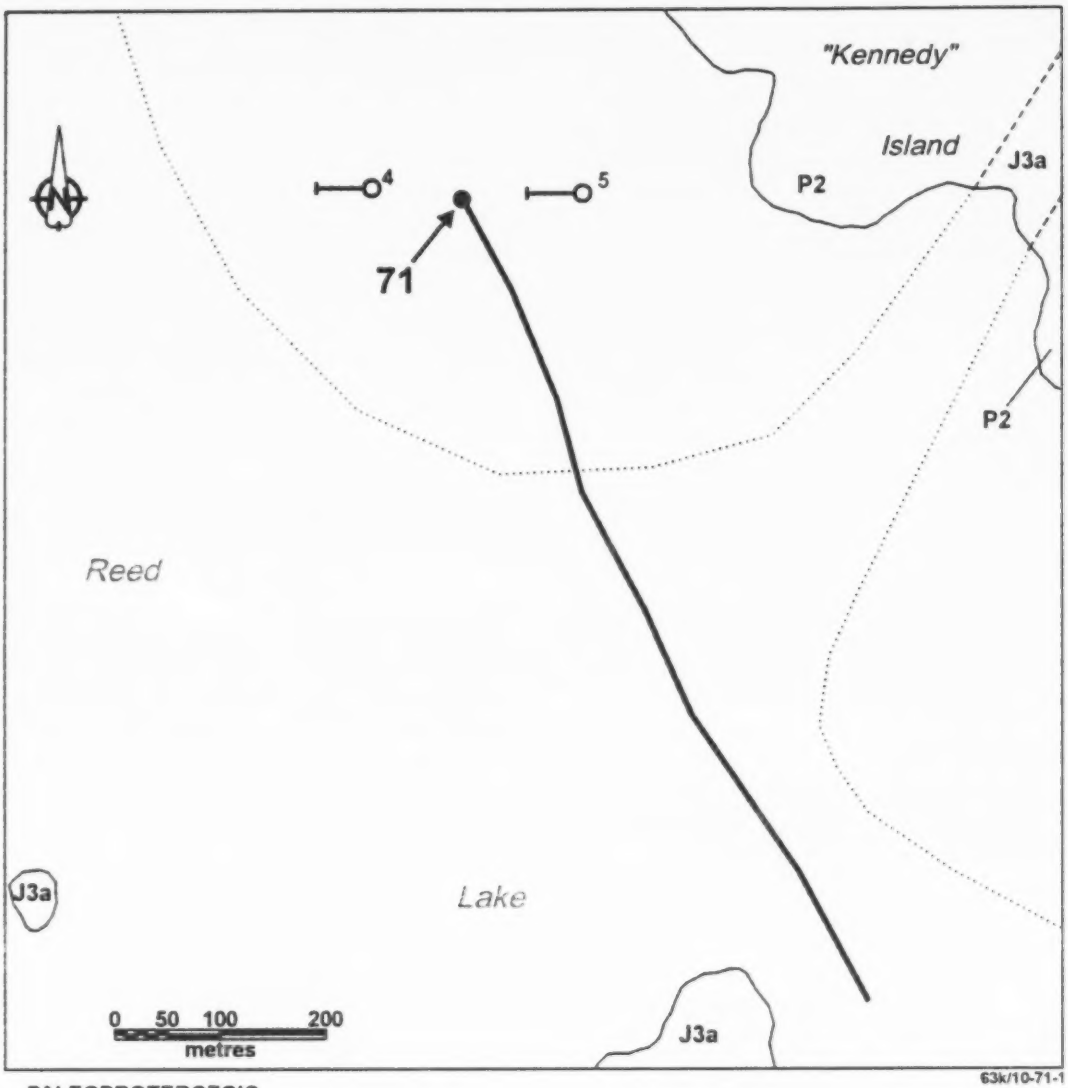
A.F. 91619, 91661, 92736, 92737 and 92738; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92736)

Drillhole (A.F. 92736)

71 Mineral occurrence location

Figure 71-1: Geological setting of Occurrence 71.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 72

NAME: mineralization intersected by diamond drilling.
UTM: 402190 E 6060365 N
AREA: under Reed Lake approximately 100 m east of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-154

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 72-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occurs to the east, SE and NW of the area. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

Diamond drillhole 8A intersected a sequence composed of metamorphosed felsic volcanic rocks ("dacite"), volcaniclastic fragmental and tuffaceous intervals, graphitic schist, and diorite (A.F. 92736).

MINERALIZATION

Sulphide mineralization in hole 8A is associated with graphitic schist over the following intervals (A.F. 92736):

Interval	Mineralization
350.5-383.0 ft. (106.8-116.7 m)	to 10% pyrite
535.0-550.0 ft. (163.1-167.6 m)	to 15% pyrite in graphitic schist
560.0-576.0 ft. (170.7-175.6 m)	near solid earthy pyrite

GEOCHEMICAL DATA

The following assay results were obtained from the mineralized intervals intersected in drillhole 8A (A.F. 92736):

Interval	%Cu	%Zn	%Ni	Au (g/t)	Ag (g/t)
371.0-376.0 ft. (113.1-114.6 m)	0.04	0.02	—	tr	1.4
564.0-570.0 ft. (171.9-173.7 m)	0.02	0.02	—	0.3	nil

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 92736; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

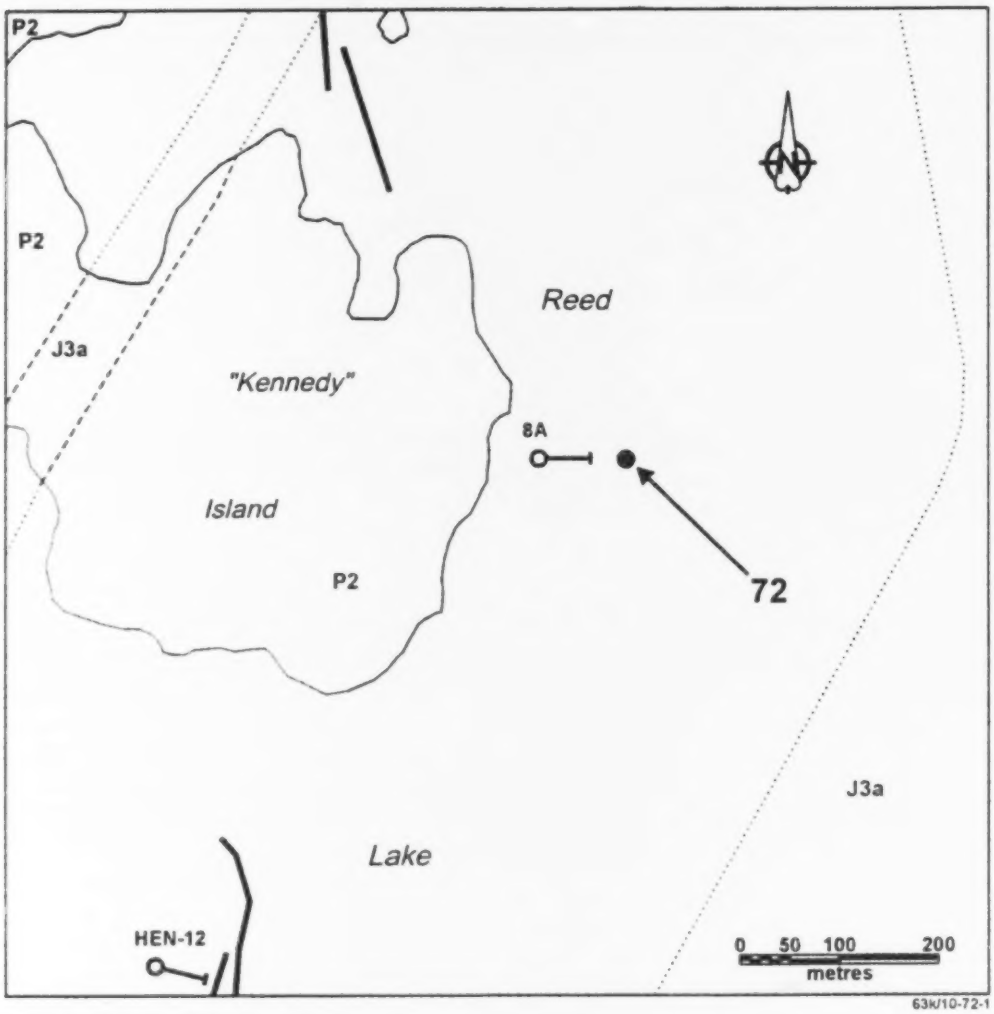
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92736)

Drillhole (A.F. 92736)

72 Mineral occurrence location

Figure 72-1: Geological setting of Occurrence 72.

LOCATION: 73

NAME: mineralization intersected by diamond drilling.
UTM: 399750 E 6059230 N
AREA: under Reed Lake, approximately 2 km SW of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-21

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB conducted an HLEM (MaxMin II) survey over the occurrence and drilled a conductor in 1981 (A.F. 93141).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 73-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994). Gabbronorite and gabbro (unit P3a) occur to the NW.

The dominant lithology intersected by hole FM-4 consists of graphitic schist with intervening felsic metavolcanic ("dacite" and "quartz porphyry") intervals (A.F. 93141).

MINERALIZATION

Hole FM-4 intersected pyrite associated with a graphitic schist unit (A.F. 93141). The mineralization is summarized below.

Interval	Mineralization
305.0-325.0 ft. (93.0-99.1 m)	15-20% pyrite

GEOCHEMICAL DATA

The following assays were returned from mineralized intervals in hole FM-4 (A.F. 93141):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
295.0-299.0 ft. (89.9-91.1 m)	—	—	0.05	0.5
305.0-314.0 ft. (93.0-95.7 m)	0.01	0.01	0.05	0.5
314.0-324.0 ft. (95.7-98.8 m)	0.01	0.01	0.05	0.5
324.0-327.0 ft. (98.8-99.7 m)	—	—	0.05	0.5

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 93141; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

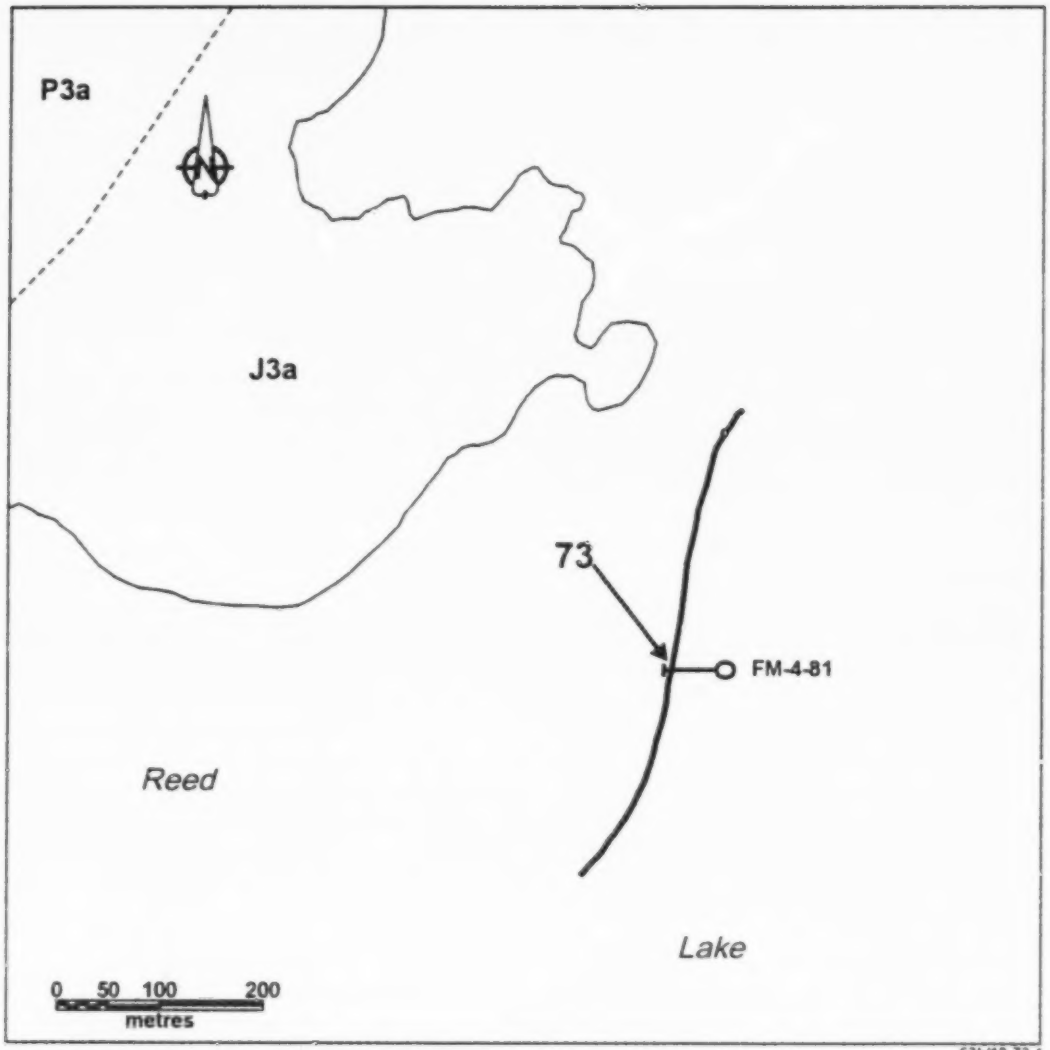
1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

P3a Gabbronorite, gabbro

J3a Andesite; derived fine-grained garnetiferous amphibolite

----- Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 93141)

Drillhole (A.F. 93141)

73 Mineral occurrence location

Figure 73-1: Geological setting of Occurrence 73.

LOCATION: 74

NAME: mineralization intersected by diamond drilling.
UTM: 400235 E 6059545 N
AREA: under Reed Lake, approximately 1.5 km SW of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-21

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB conducted an HLEM (MaxMin II) survey over the occurrence and drilled the geophysical response in 1981 (A.F. 93141).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 74-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

Hole FM-2 intersected a fine grained, felsic metavolcanic sequence ("rhyolite", "quartz porphyry" and "dacite") (A.F. 93141).

MINERALIZATION

Pyrite occurs at the contact between a fine grained rhyolite and a quartz porphyry in hole FM-2 over the following intervals (A.F. 93141):

Interval	Mineralization
267.0-269.5 ft. (81.4-82.1 m)	5-10% pyrite as stringers
273.0-282.0 ft. (83.2-86.0 m)	15-25% pyrite
282.0-287.5 ft. (86.0-87.6 m)	50% pyrite
287.5-292.0 ft. (87.6-89.0 m)	10% pyrite, disseminated

GEOCHEMICAL DATA

The following assays were obtained from the mineralized intervals intersected in hole FM-2 (A.F. 93141):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
245.0-247.0 ft. (74.7-75.3 m)	—	—	0.05	0.5
267.0-269.5 ft. (81.4-82.1 m)	—	—	0.05	0.5
273.0-277.0 ft. (83.2-84.4 m)	0.01	—	0.05	0.5
277.0-282.0 ft. (84.4-86.0 m)	0.01	0.01	0.05	0.5
282.0-287.5 ft. (86.0-87.6 m)	0.03	0.01	0.05	0.5
287.5-292.0 ft. (87.6-89.0 m)	—	—	0.05	1.0
292.0-296.0 ft. (89.0-90.2 m)	—	—	0.05	0.5
310.0-315.0 ft. (94.5-96.0 m)	—	—	0.05	0.5
315.0-319.0 ft. (96.0-97.2 m)	—	—	0.05	0.5
319.0-322.0 ft. (97.2-98.1 m)	—	—	0.05	0.5

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 91619, 91661 and 93141; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

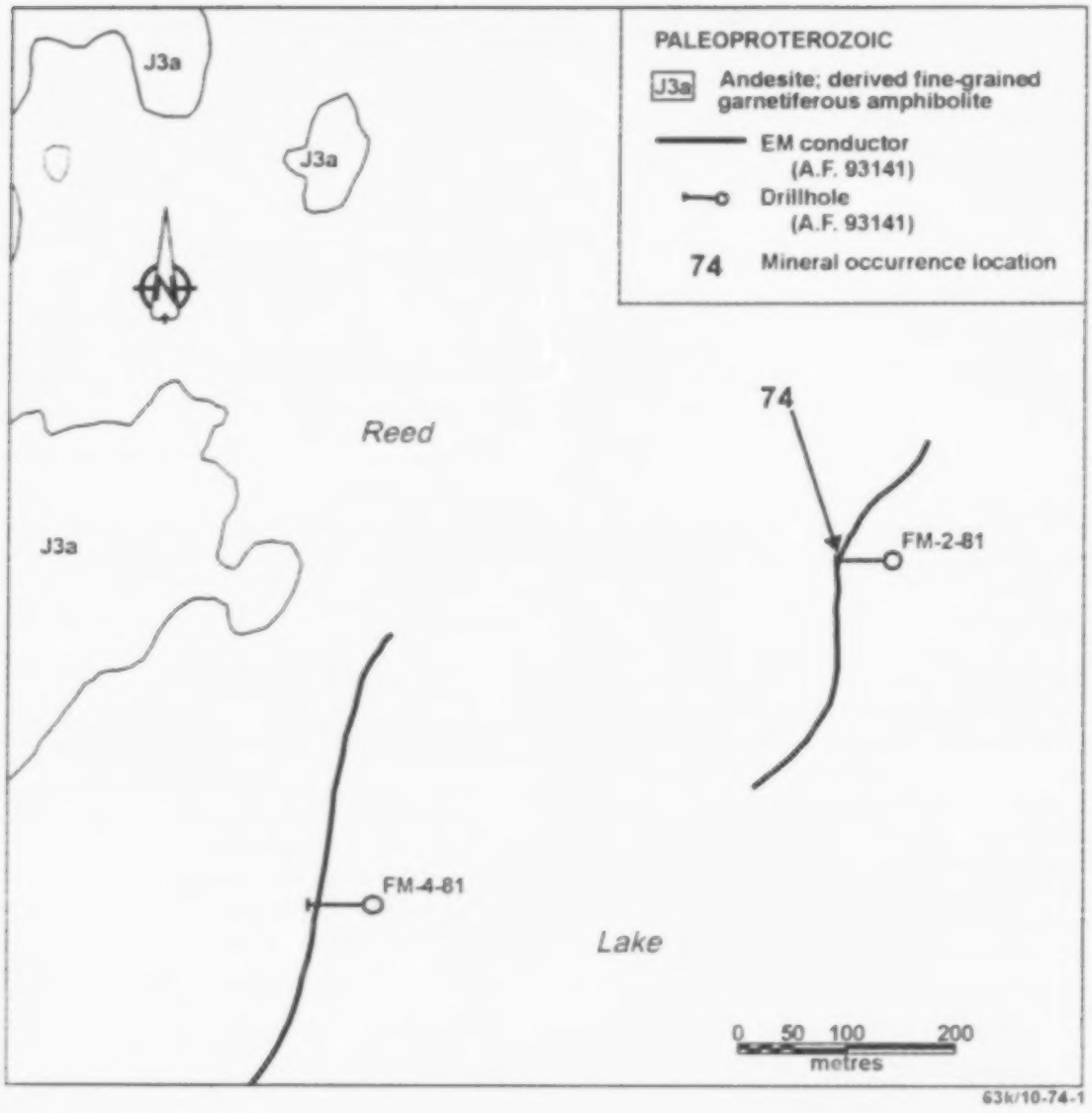


Figure 74-1: Geological setting of Occurrence 74.

LOCATION: 75

NAME: mineralization intersected by diamond drilling.
UTM: 401720 E, 6059705 N
AREA: under Reed Lake, approximately 450 m S of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-21

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1955-56 several EM conductors delineated by a ground survey in the Kennedy Island area were drilled by Hudson Bay Exploration and Development Company, Limited (A.F. 90252). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1971 an HLEM (Turam) survey was performed for Straus Exploration Inc. (A.F. 92737). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the vicinity of Kennedy Island (A.F. 92736).

GEOLOGICAL SETTING

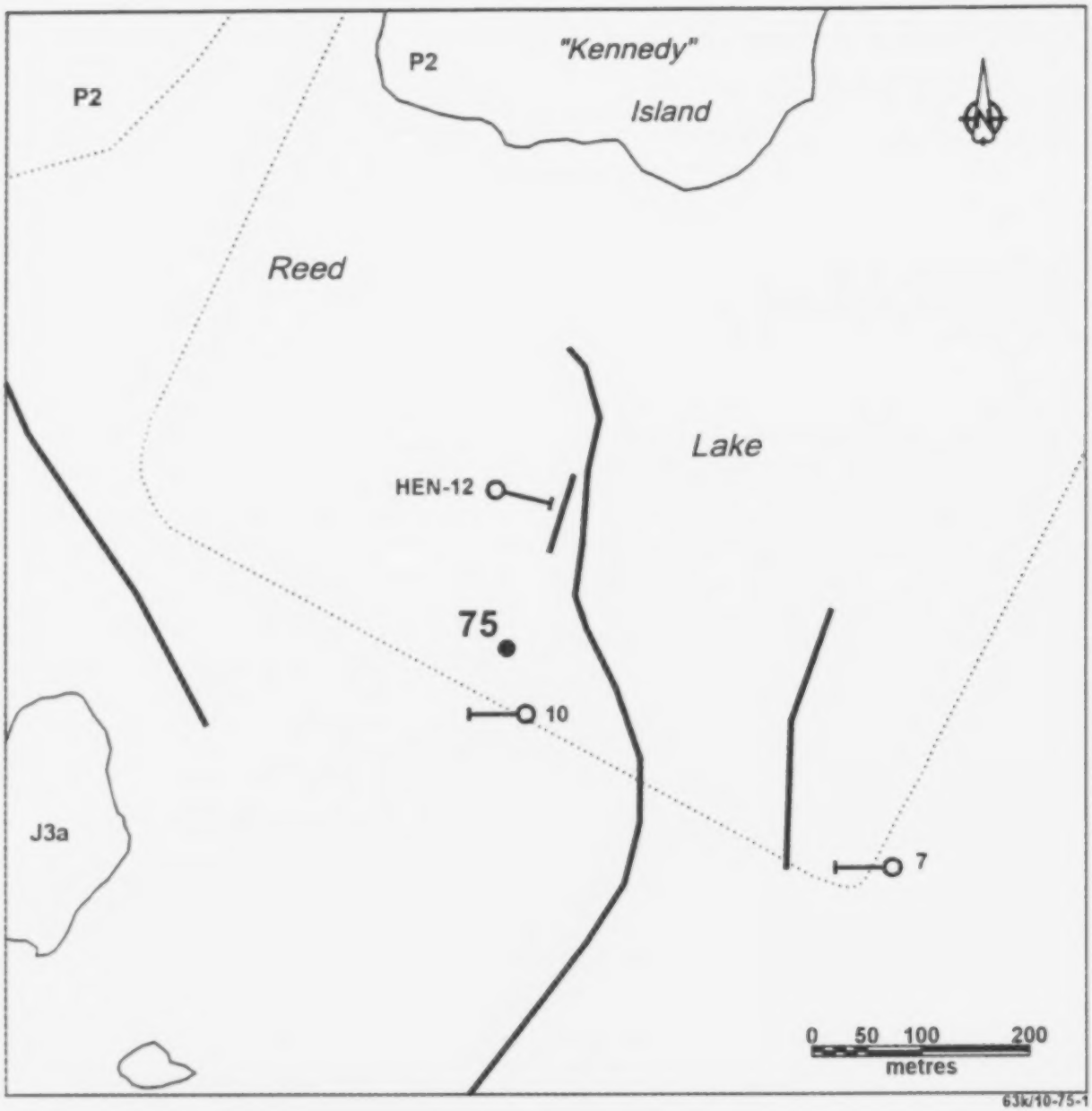
The geological unit designations indicated on the geological setting map (Fig. 75-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occurs to the SE, south and NW of the area. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

The litholog for hole HEN-12 indicates that the drilled sequence consists of graphitic, siliceous graphitic, and sericite-chlorite schists (A.F. 90252). A similar sequence was intersected by hole 10, but several intermediate and felsic metavolcanic units ("dacite" and "rhyolite") occur above and below the schistose intervals (A.F. 92736).

MINERALIZATION

Mineralization in holes HEN-12 and 10 is mainly associated with graphitic schist (A.F. 90252, 92736). Lesser sulphides were intersected in hole 10 associated with brcciated (fragmental?) rhyolite and "dacite" (A.F. 92736). The mineralized intervals are summarized below (see following table).

Interval	Mineralization
hole HEN-12	
197.5-236.0 ft. (60.2-71.9 m)	well mineralized with pyrite, some pyrrhotite, in graphitic schist
274.0-302.0 ft. (83.5-92.0 m)	well mineralized with pyrite and pyrrhotite, in graphitic schist
385.4-430.8 ft. (117.5-131.3 m)	well mineralized to near solid pyrite and pyrrhotite, in graphitic schist
457.7-521.6 ft. (139.5-159.0 m)	well mineralized to near solid pyrite and pyrrhotite, graphite
hole 10	
162.5-163.5 ft. (49.5-49.8 m)	10% pyrite
232.0-234.0 ft. (70.7-71.3 m)	5% pyrite
258.0-263.5 ft. (78.6-80.3 m)	7% pyrite, minor pyrrhotite
293.5-297.5 ft. (89.5-90.7 m)	12-15% pyrite in graphitic schist
304.0-324.0 ft. (92.7-98.8 m)	10% pyrite, in graphitic schist
359.0-364.0 ft. (109.4-110.9 m)	15% pyrite, in graphitic schist
439.5-442.5 ft. (134.0-134.9 m)	15% pyrrhotite, tr chalcopyrite
472.0-474.0 ft. (143.9-144.5 m)	20% pyrrhotite, minor graphite
483.0-494.0 ft. (147.2-150.6 m)	10% pyrite and pyrrhotite, in graphitic schist
510.0-515.0 ft. (155.4-157.0 m)	15% pyrrhotite, minor pyrite, disseminated



PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1988

EM conductor (A.F. 90252, 92737)

Drillhole (A.F. 90252, 92736)

75 Mineral occurrence location

Figure 75-1: Geological setting of Occurrence 75.

GEOCHEMICAL DATA

No assays were reported for hole HEN-12. The following assays were obtained from mineralized intervals in hole 10 (A.F. 92736):

Interval	%Cu	%Zn	%Ni	Au (g/t)	Ag (g/t)
162.5-163.5 ft. (49.5-49.8 m)	—	—	—	tr	tr
232.0-234.0 ft. (70.7-71.3 m)	—	—	—	tr	0.7
294.0-298.0 ft. (89.6-90.8 m)	0.03	0.02	—	0.3	0.3
316.0-321.0 ft. (96.3-97.8 m)	0.02	0.05	—	0.3	nil
439.5-443.5 ft. (134.0-135.2 m)	0.03	0.03	tr	tr	nil
510.0-515.0 ft. (155.4-157.0 m)	0.03	0.05	tr	tr	tr
562.0-567.0 ft. (171.3-172.8 m)	0.03	0.03	—	tr	0.7

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 90252, 91619, 91661, 92736 and 92737; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 76

NAME: mineralization intersected by diamond drilling.
UTM: 401980 E 6059510 N
AREA: under Reed Lake, approximately 650 m S of south end of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-21

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). In 1972 Mr A.L. Parres drilled several conductors defined by a ground geophysical survey in the area of Kennedy Island (A.F. 92736).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 76-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by gabbro, diorite, quartz diorite and derived amphibolite (unit P2). Andesite and derived fine-grained garnetiferous amphibolite (unit J3a) occurs to the south of the area. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

The sequence intersected by hole 7 is dominated by fine grained graphitic and non-graphitic metasediments. Minor felsic (metavolcanic?) units occur intercalated with the metasedimentary rocks, and massive mafic units occur at the top and bottom of the hole (A.F. 92736).

MINERALIZATION

Sulphide mineralization intersected in hole 7 occurs as disseminated and earthy pyrite in both graphitic and non-graphitic metasedimentary rocks (A.F. 92736), and is summarized below:

Interval	Mineralization
253.0-411.5 ft. (77.1-125.4 m)	10-15% pyrite, in graphitic unit
477.0-478.0 ft. (145.4-145.7 m)	near solid pyrite, earthy
488.0-498.0 ft. (148.7-151.8 m)	10% pyrite, graphitic metasediment

GEOCHEMICAL DATA

The following assay was obtained from one of the mineralized intervals in hole 7 (A.F. 92736):

Interval	%Cu	%Zn	Au g/t	Ag (g/t)
335.0-340.0 ft. (102.1-103.6 m)	tr	tr	tr	nil

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 92736; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

PALEOPROTEROZOIC

P2 Gabbro, diorite, quartz diorite and derived amphibolite

J3a Andesite; derived fine-grained garnetiferous amphibolite

Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92736)

Drillhole (A.F. 92736)

76 Mineral occurrence location

Figure 76-1: Geological setting of Occurrence 76.

LOCATION: 77

NAME: mineralization intersected by diamond drilling.
UTM: 400275 E 6058190 N
AREA: under Reed Lake, north of small group of islands approximately 2.4 km SSW of Kennedy Island (unofficial name).
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-22

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB conducted an HLEM (MaxMin II) survey over the occurrence and drilled the geophysical response in 1981 (A.F. 93141).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 77-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Quartz ferrodiorite, ferrotonalite and leucotonalite (unit P3c), and ferrogabbro (unit P3b) occur to the WSW of the occurrence. Similar metavolcanic rocks bordering the Reed Lake gabbro to the south comprise an assemblage of metamorphosed arc tholeiite basalts and intercalated volcaniclastic and epiclastic sedimentary units (Syme and Bailes, 1996; Syme *et al.*, 1995; Williamson, 1994).

The sequence intersected by drillhole FM-3 is dominated by graphitic schist with lesser altered felsic metavolcanic ("rhyolite") and minor "tuffaceous" intervals (A.F. 93141).

MINERALIZATION

The host lithology for the main mineralized interval in hole FM-3 is a unit containing minor (?) graphite. Graphitic schist hosts other mineralized intervals (A.F. 93141), as summarized below.

Interval	Mineralization
204.4-246.5 ft. (62.3-75.1 m)	to 50% pyrite, in part earthy
260.0-277.0 ft. (79.2-84.4 m)	10-20% pyrite, in graphitic schist
283.3-288.7 ft. (86.3-88.0 m)	15% pyrite, in siliceous graphitic schist

GEOCHEMICAL DATA

Assays obtained from mineralized intervals in drillhole FM-3 are summarized as follows (A.F. 93141) (see table below).

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
155.0-167.0 ft. (47.2-50.9 m)	—	—	0.05	1.0
167.0-174.3 ft. (50.9-53.1 m)	—	—	0.05	0.5
174.3-185.0 ft. (53.1-56.4 m)	—	—	0.05	0.5
200.0-204.4 ft. (61.0-62.3 m)	—	—	0.05	0.5
204.4-210.0 ft. (62.3-64.0 m)	0.11	0.01	0.05	1.0
210.0-218.0 ft. (64.0-66.4 m)	0.06	0.01	0.05	0.5
218.0-227.0 ft. (66.4-69.2 m)	0.02	0.01	0.05	1.0
227.0-232.0 ft. (69.2-70.7 m)	0.02	0.01	0.05	0.5
232.0-237.0 ft. (70.7-72.2 m)	0.03	0.01	0.05	1.0
237.0-241.0 ft. (72.2-73.5 m)	0.01	0.01	0.05	0.5
241.0-246.5 ft. (73.5-75.1 m)	0.02	0.01	0.05	0.5
260.0-265.2 ft. (79.2-80.8 m)	0.01	0.01	0.05	0.5
265.2-271.0 ft. (80.8-82.6 m)	—	—	0.05	0.5
271.0-277.0 ft. (82.6-84.4 m)	—	—	0.05	1.0
277.0-283.3 ft. (84.4-86.3 m)	—	—	0.05	0.5
283.3-288.7 ft. (86.3-88.0 m)	—	0.01	0.05	2.0

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 93141; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

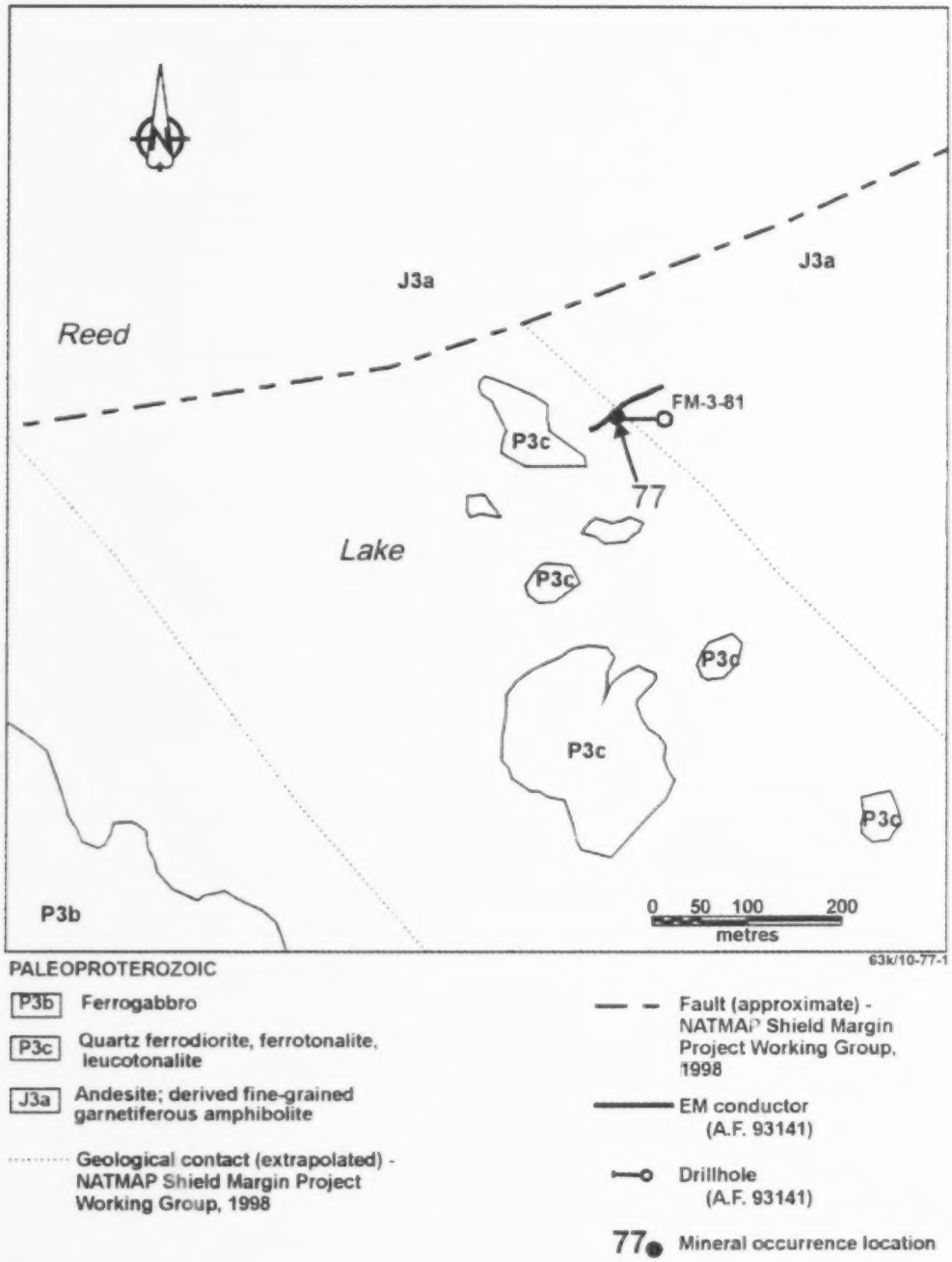


Figure 77-1: Geological setting of Occurrence 77.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 78

NAME: mineralization intersected by diamond drilling.
UTM: 391335 E 6057075 N
AREA: approximately 1.2 km NNE of Flag Lake.
ACCESS: via boat along the Grass River from Iskwasum provincial campground, then traverse.
AIRPHOTO: A26325-87

EXPLORATION SUMMARY

Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey over the area (A.F. 90263, 90264).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 78-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by layered gabbro, leucogabbro and anorthosite (unit F6c) and layered pyroxenite, peridotite and subordinate gabbro (unit F6d) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b) of the Flag Lake strand of the West Reed-North Star shear zone occurs to the west.

Hole HEN-64 intersected a sequence of gneisses (hornblende-biotite and hornblende-feldspar-biotite), diorite and hornblende andesite (A.F. 90250).

MINERALIZATION

Sulphide mineralization in drillhole HEN-64 occurs in a "silicified gneiss" over the following interval (A.F. 90250) (see table).

Interval	Mineralization
244.1-283.1 ft. (74.4-86.3 m)	to well mineralized with pyrrhotite, minor pyrite, trace chalcopyrite and sphalerite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. Rocks appear to be strongly sheared.

REFERENCES

A.F. 90250, 90263 and 90264; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

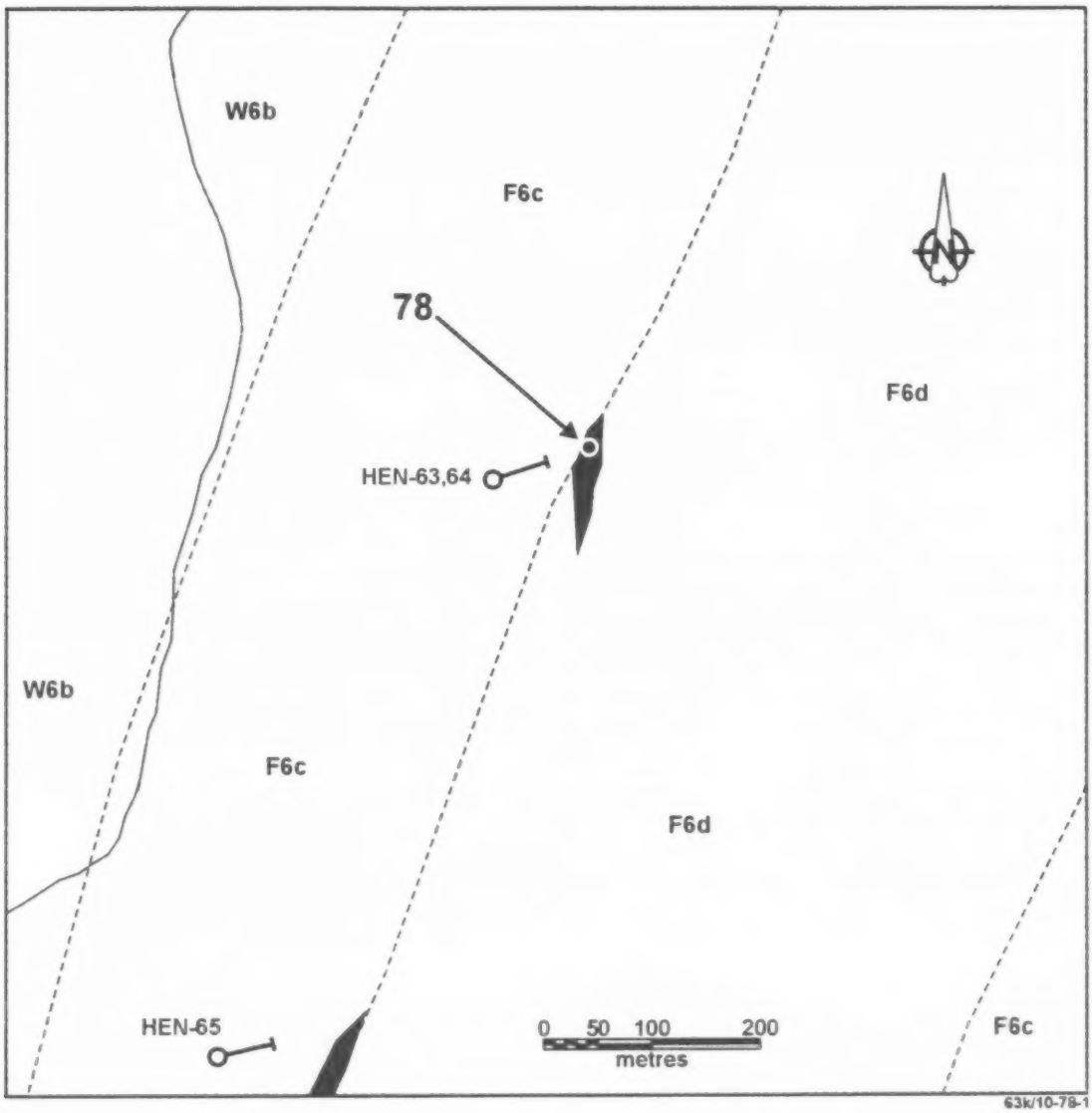
NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Williamson, B.L.

1992: Reed Lake Gabbro project; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.



PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

F6c Layered gabbro, leucogabbro, anorthosite

F6d Layered pyroxenite, peridotite, subordinate gabbro

----- Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 90250)

Drillhole (A.F. 90250)

78 Mineral occurrence location

Figure 78-1: Geological setting of Occurrence 78.

LOCATION: 79

NAME: mineralization intersected by diamond drilling.
UTM: 391120 E 6056550 N
AREA: approximately 0.6 km NNE of Flag Lake.
ACCESS: via boat along the Grass River from Iskwasum provincial campground, then traverse.
AIRPHOTO: A26325-87

EXPLORATION SUMMARY

Electromagnetic surveys were performed in the area by Hudson Bay Mining and Smelting Company, Limited, and several conductors defined by this survey were drilled in 1957-58 (A.F. 90250). In 1972 Hudson Bay Exploration and Development Company, Limited performed an EM (Turam) survey (A.F. 90263, 90264).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 79-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by layered gabbro, leucogabbro and anorthosite (unit F6c) and layered pyroxenite, peridotite and subordinate gabbro (unit F6d) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b) of the Flag Lake strand of the West Reed-North Star shear zone occurs to the west.

Hole HEN-65 intersected a sequence of foliated hornblende-biotite-feldspar gneisses, diorite and andesite (A.F. 90250).

MINERALIZATION

The host lithology for the sulphide mineralization in drillhole HEN-65 was not described in the litholog, but it occurs at the contact between "quartz hornblende diorite" and hornblende-biotite-feldspar gneiss, and is summarized below (A.F. 90250) (see table).

Interval	Mineralization
173.5-178.8 ft. (52.9-54.5 m)	well mineralized to near solid pyrrhotite, minor pyrite, trace chalcopyrite and sphalerite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Possibly volcanic rock-associated, strongly sheared.

REFERENCES

A.F. 90250, 90263 and 90264; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Williamson, B.L.

1992: Reed Lake Gabbro project; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.

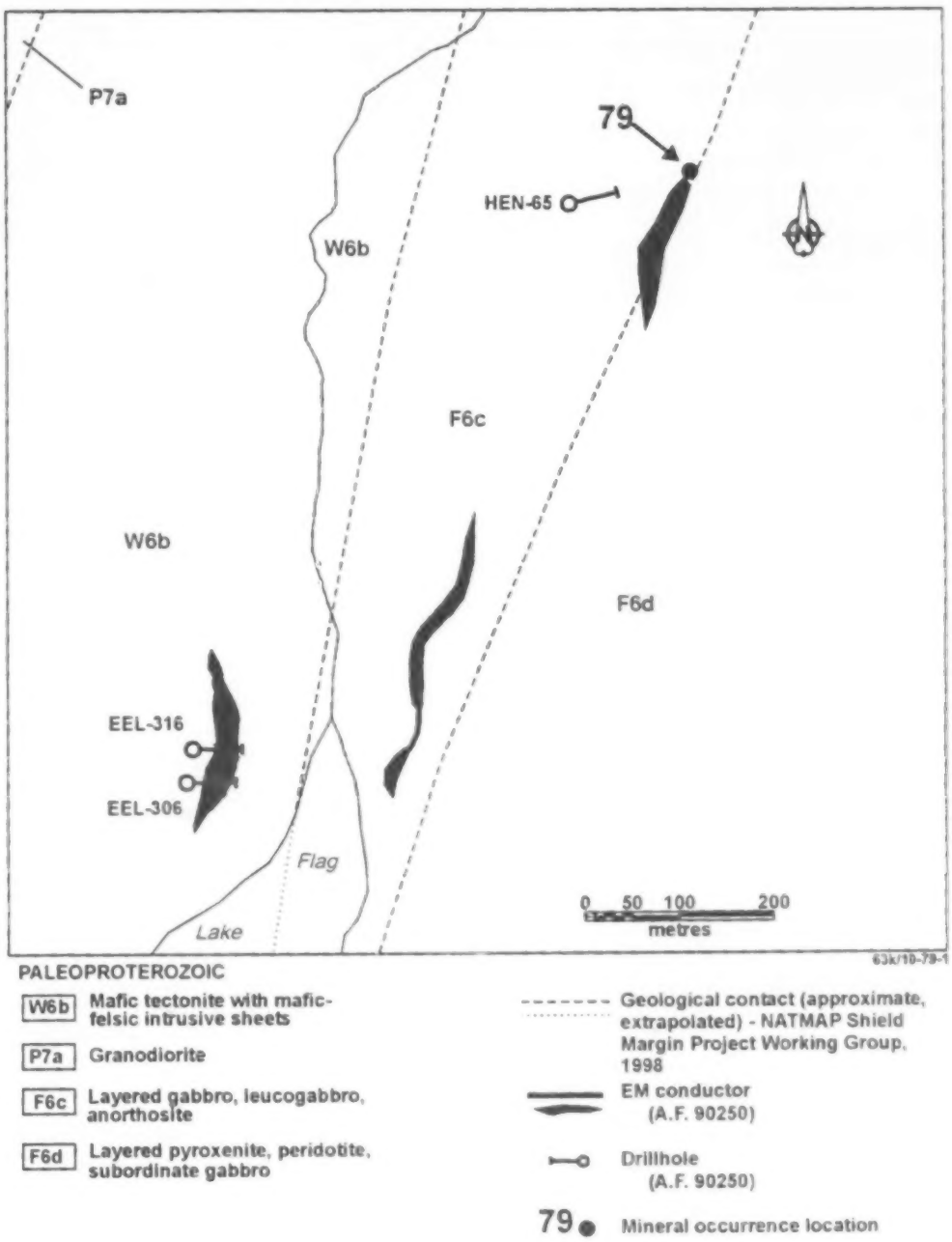


Figure 79-1: Geological setting of Occurrence 79.

LOCATION: 80

NAME: mineralization intersected by diamond drilling.
UTM: 402090 E, 6056285 N
AREA: under Reed Lake approximately 1.6 km N of Peterson's Lodge, Fourmile Island.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-151

EXPLORATION SUMMARY

Hudson Bay Exploration and Development Company, Limited undertook a ground EM (Turam) survey over the area and subsequently drilled several of the conductive responses in 1972 (A.F. 91667).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 80-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by tholeiitic basalt, basaltic andesite, gabbro and derived amphibolite (unit J1a) (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994).

Hole EEL-172 intersected a sequence dominated by metasedimentary rocks consisting of graphitic metamorphosed argillite, greywacke and minor arkose. A felsic metavolcanic interval ("dacite" and "rhyolite") occurs at the bottom of the hole (A.F. 91667).

MINERALIZATION

The host rock to the main mineralized interval in hole EEL-172, from 206.0-471.8 ft. (62.8 to 143.8 m) was not described, but the presence of graphite throughout this interval suggests that it is a metasedimentary sequence, at least in part. The last three mineralized intervals indicated in the table below are hosted by a sequence of fine- to medium-grained metasedimentary rocks (A.F. 91667):

Interval	Mineralization
266.5-274.5 ft. (81.2-83.7 m)	5% pyrite, 20% graphite
287.8-292.7 ft. (87.7-89.2 m)	5% pyrite, 10% graphite
298.5-343.2 ft. (91.0-104.6 m)	5% pyrite, 30% graphite
350.9-422.1 ft. (107.0-128.7 m)	20% pyrite, 40% graphite
425.0-442.3 ft. (129.5-134.8 m)	5% pyrite, 5% graphite
451.6-457.0 ft. (137.6-139.3 m)	5% pyrite, 5% graphite
469.0-471.0 ft. (143.0-143.6 m)	80% pyrite, 3% graphite
474.3-475.4 ft. (144.6-144.9 m)	60% pyrite, 3% graphite
476.1-477.4 ft. (145.1-145.5 m)	60% pyrite, 3% graphite
477.4-479.0 ft. (145.5-146.0 m)	5% pyrite, 3% graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91667; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Minerals Division, Report of Activities, 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

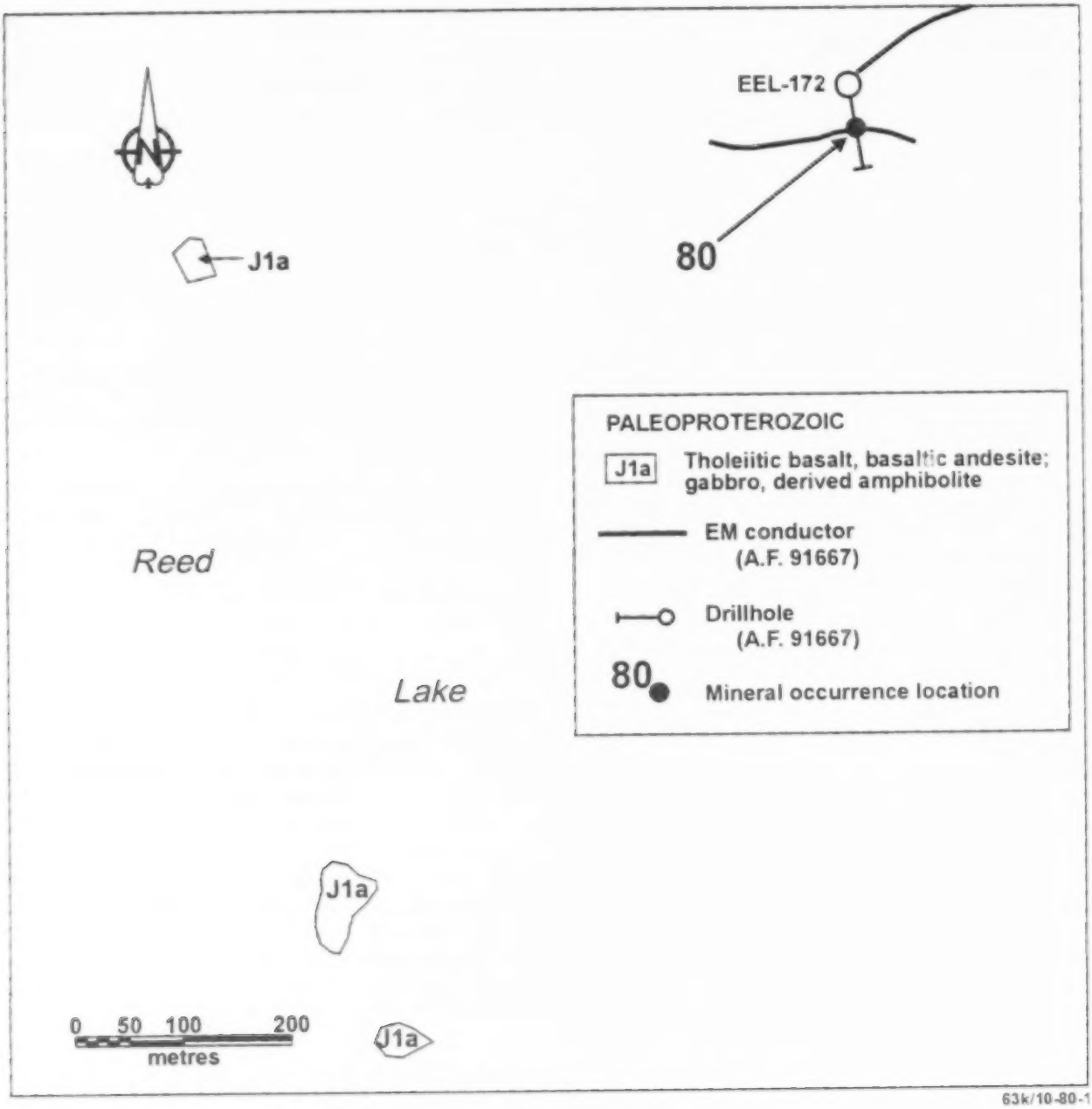


Figure 80-1: Geological setting of Occurrence 80.

LOCATION: 81

NAME: mineralization intersected by diamond drilling.
UTM: 387095 E, 6052780 N
AREA: under east side of Loucks Lake near Grass River.
ACCESS: via boat from Iskwasum Lake provincial campground.
AIRPHOTO: A26325-96

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, after which an interpretation of the results was performed (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). In 1985 Granges Exploration Limited drilled several HLEM conductors under Loucks Lake (A.F. 92819).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 81-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic phyllonite, tectonite and mylonite (unit W6a) and felsic tectonite and mylonite (unit P11a) of the Loucks Lake shear zone, which is hosted by granodiorite and tonalite (units P7a and P7b) of the Gants Lake batholith (Syme, 1994).

Hole RAD-12 intersected quartz-chlorite schist and a foliated "dacite" (A.F. 92819).

MINERALIZATION

All the sulphide mineralization in hole RAD-12 occurs in quartz-chlorite schist over the following intervals (A.F. 92819) (see following table).

Interval	Mineralization
50.90-51.66 m	5% pyrrhotite, 3% pyrite, graphite
63.09-63.64 m	5% pyrrhotite, banded

GEOCHEMICAL DATA

The following assays were obtained from sulphide-bearing intervals in hole RAD-12 (A.F. 92819):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
41.45-41.88 m	0.01	0.01	0.05	1.0
50.90-51.66 m	0.02	0.01	0.05	0.5
59.92-60.75 m	0.02	0.02	0.05	0.5
63.09-63.64 m	0.02	0.02	0.05	0.5

CLASSIFICATION

Disseminated mineralization - not classified. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91708, 91854, 92472 and 92819; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.

PALEOPROTEROZOIC

- W6a — Mafic tectonite, phyllonite, mylonite
- P11a — Felsic tectonite, mylonite
- P7a — Granodiorite
- P7b — Granodiorite to tonalite
- ····· Geological contact (extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- — – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- ——— EM conductor (A.F. 92819)
- —o Drillhole (A.F. 92819)
- 81● Mineral occurrence location

Figure 81-1: Geological setting of Occurrence 81.

LOCATION: 82

NAME: mineralization intersected by diamond drilling.
UTM: 395140 E 6055225 N
AREA: under western Reed Lake, approximately 350 m NE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-188

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Several holes were drilled by Hudson Bay Exploration and Development Company, Limited in 1973 to test several EM (Turam) responses in the area (A.F. 92447).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 82-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by mafic tectonite with mafic-felsic intrusive sheets (unit W6b) that are part of the Reed Lake strand of the West Reed-North Star Lake shear zone (Syme *et al.*, 1995). Layered gabbro, leucogabbro and anorthosite (unit F6c) of the Reed Lake mafic-ultramafic complex (Williamson, 1992; 1993) occur in the western part of the area.

Hole EEL-226 intersected a sequence of "flow-banded" felsic and intermediate to mafic metavolcanic rocks ("banded andesite") (A.F. 92447).

MINERALIZATION

The mineralization in hole EEL-226 occurs in banded "andesite" containing lighter, more felsic intervals (A.F. 92447). Only one mineralized interval was intersected, as summarized below (see following table).

Interval	Mineralization
413.0-415.0 ft. (125.9-126.5 m)	tr-8% pyrite, trace pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Disseminated mineralization - not classified. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 92447; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

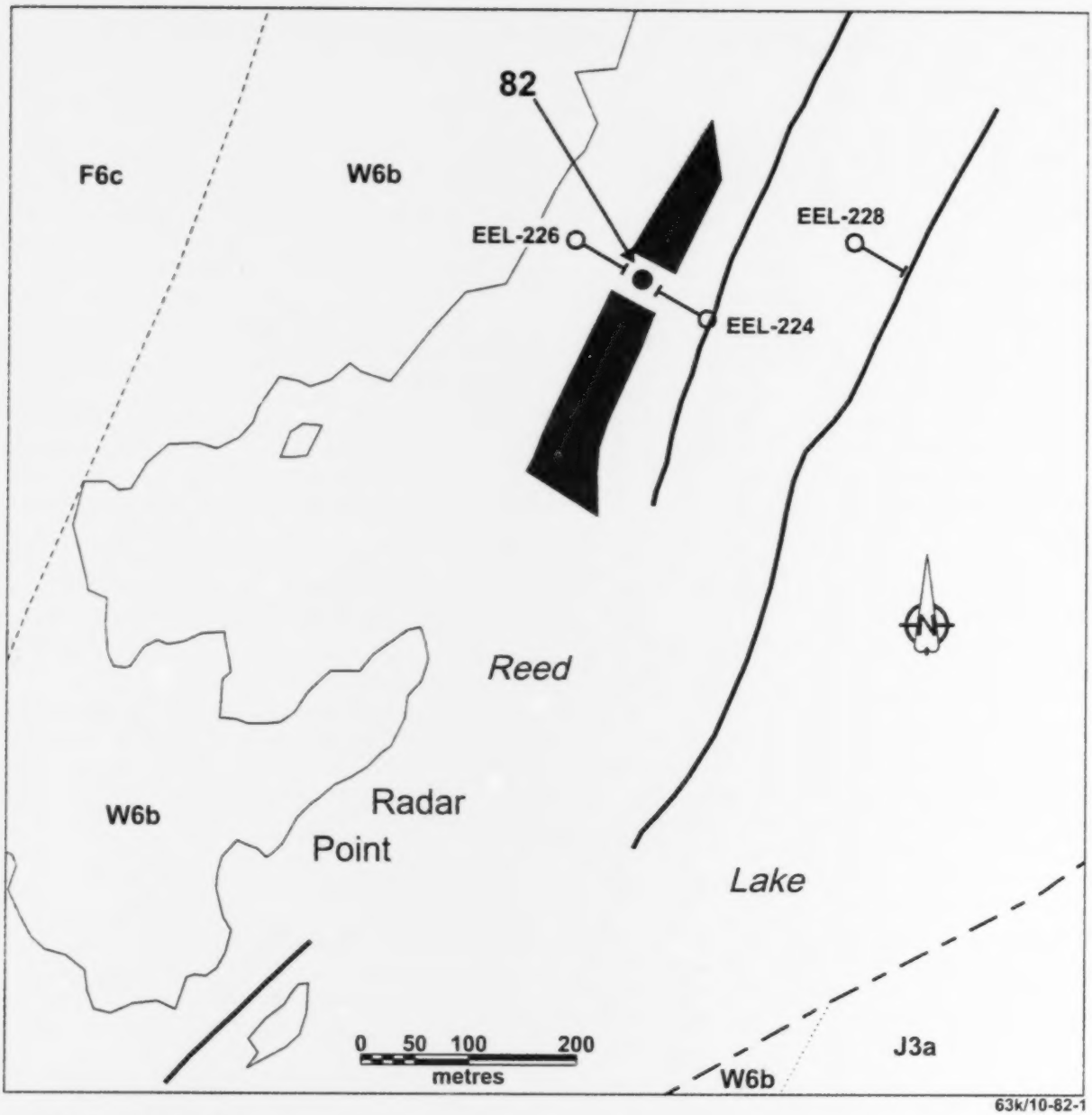
Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1992: Reed Lake Gabbro project; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1992, p. 153.

1993: Petrologic studies of the Reed Lake gabbro and Claw Lake gabbroic complex; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1993, p.119.



PALEOPROTEROZOIC

- W6b — Mafic tectonite with mafic-felsic intrusive sheets
- J3a — Andesite; derived fine-grained garnetiferous amphibolite
- F6c — Layered gabbro, leucogabbro, anorthosite
- Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998
- Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998
- EM conductor (A.F. 92447)
- Drillhole (A.F. 92447)
- 82 — Mineral occurrence location

Figure 82-1: Geological setting of Occurrence 82.

LOCATION: 83

NAME: mineralization intersected by diamond drilling.
UTM: 395620 E 6053970 N
AREA: under western side of Reed Lake, approximately 0.9 km SE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Several holes were drilled by Hudson Bay Exploration and Development Company, Limited in 1973 to test several EM (Turam) responses in the area (A.F. 92447).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 83-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has suggested that these are arc tholeiites (Syme *et al.*, 1995, Syme and Bailes, 1996; Williamson, 1994). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b), part of the Reed Lake strand of the West Reed-North Star Lake shear zone (Syme *et al.*, 1995), occurs to the west and SW.

Hole EEL-223 intersected a sequence of (flow?) banded and foliated felsic volcanic rocks, most of which are described as being fragmental (A.F. 92447). Chlorite±graphite and lesser sericite schist intervals are common.

MINERALIZATION

The sulphides occur as disseminations, dominantly in discrete, thin, banded intervals. Some of the intervals grade into "massive" sulphides (A.F. 92447). The mineralization intersected by hole EEL-223 is summarized below.

Interval	Mineralization
96.0-98.0 ft. (29.3-29.9 m)	2-25% pyrite
104.0-107.7 ft. (31.7-32.8 m)	3-10% pyrite, trace to 2% graphite
121.8-125.0 ft. (37.1-38.1 m)	1-8% pyrite, trace to 2% graphite
129.0-131.3 ft. (39.3-40.0 m)	2-25% pyrite, 1-8% graphite
132.8-135.8 ft. (40.5-41.4 m)	3-8% pyrite, 1-2% graphite
144.2-149.2 ft. (44.0-45.5 m)	1-10% pyrite, 3-10% pyrrhotite, trace chalcopyrite, trace to 5% graphite
172.0-174.7 ft. (52.4-53.2 m)	1-8% pyrrhotite
315.0-318.3 ft. (96.0-97.0 m)	2-10% pyrrhotite, trace chalcopyrite
346.9-347.9 ft. (105.7-106.0 m)	2-10% pyrrhotite
350.4-351.5 ft. (106.8-107.1 m)	2-20% pyrrhotite, 1% pyrite
355.4-357.0 ft. (108.3-108.8 m)	2-20% pyrrhotite, trace pyrite
365.0-370.0 ft. (111.3-112.8 m)	2-20% pyrrhotite, trace pyrite and graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

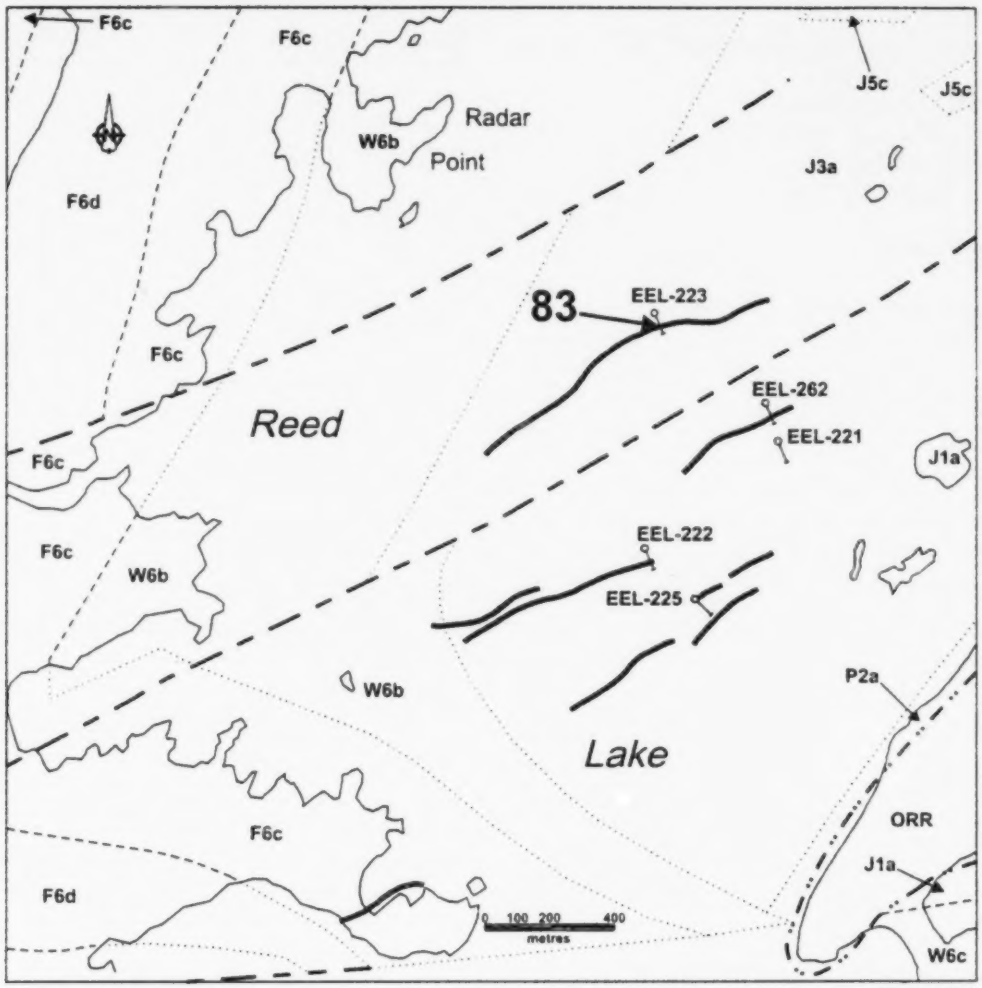
A.F. 91619, 91661 and 92447; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.



PALEOZOIC

ORR Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

W6c Mafic phyllonite ± carbonate, cataclasite

P2a Gabbro, diorite

F6c Layered gabbro, leucogabbro, anorthosite

F6d Layered pyroxenite, peridotite, subordinate gabbro

J5c Heterolithologic breccia, dominantly mafic fragments

J3a Andesite; derived fine-grained garnetiferous amphibolite

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Paleozoic boundary

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92447)

Drillhole (A.F. 92447)

83 Mineral occurrence location

Figure 83-1: Geological setting of Occurrence 83.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 84

NAME: mineralization intersected by diamond drilling.
UTM: 395595 E 6053245 N
AREA: under western Reed Lake, approximately 1.3 km SSE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Several holes were drilled by Hudson Bay Exploration and Development Company, Limited in 1973 to test several EM (Turam) responses in the area (A.F. 92447).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 84-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b), part of the Reed Lake strand of the West Reed-North Star Lake shear zone (Syme *et al.*, 1995), occurs to the west and SW.

Hole EEL-222 intersected a sequence of (flow?) banded and foliated felsic volcanic rocks, most of which are described as being fragmental (A.F. 92447). Chlorite and sericite schist intervals are common.

MINERALIZATION

Sulphides occur as disseminations, dominantly in discrete, thin, banded intervals. Some of the intervals grade into "massive" sulphides (A.F. 92447). The mineralization intersected in hole EEL-222 is summarized below:

Interval	Mineralization
162.3-164.5 ft. (49.5-50.1 m)	2-20% pyrite
178.2-179.2 ft. (54.3-54.6 m)	1-10% pyrite
242.4-243.1 ft. (73.9-74.1 m)	1-2% pyrite, 2-5% pyrrhotite
246.2-248.2 ft. (75.0-75.7 m)	tr to 5% pyrite, 1-5% pyrrhotite
251.3-253.7 ft. (76.6-77.3 m)	1-10% pyrite
287.6-289.2 ft. (87.7-88.1 m)	2-8% pyrite
291.2-292.5 ft. (88.8-89.2 m)	2-15% pyrite, 1-2% pyrrhotite
336.1-341.1 ft. (102.4-104.0 m)	5-60% pyrrhotite
369.0-374.0 ft. (112.5-114.0 m)	5-10% pyrrhotite, tr pyrite
434.7-438.7 ft. (132.5-133.7 m)	2-8% pyrrhotite, 5-20% pyrite
457.5-459.0 ft. (139.4-140.0 m)	5-15% pyrrhotite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

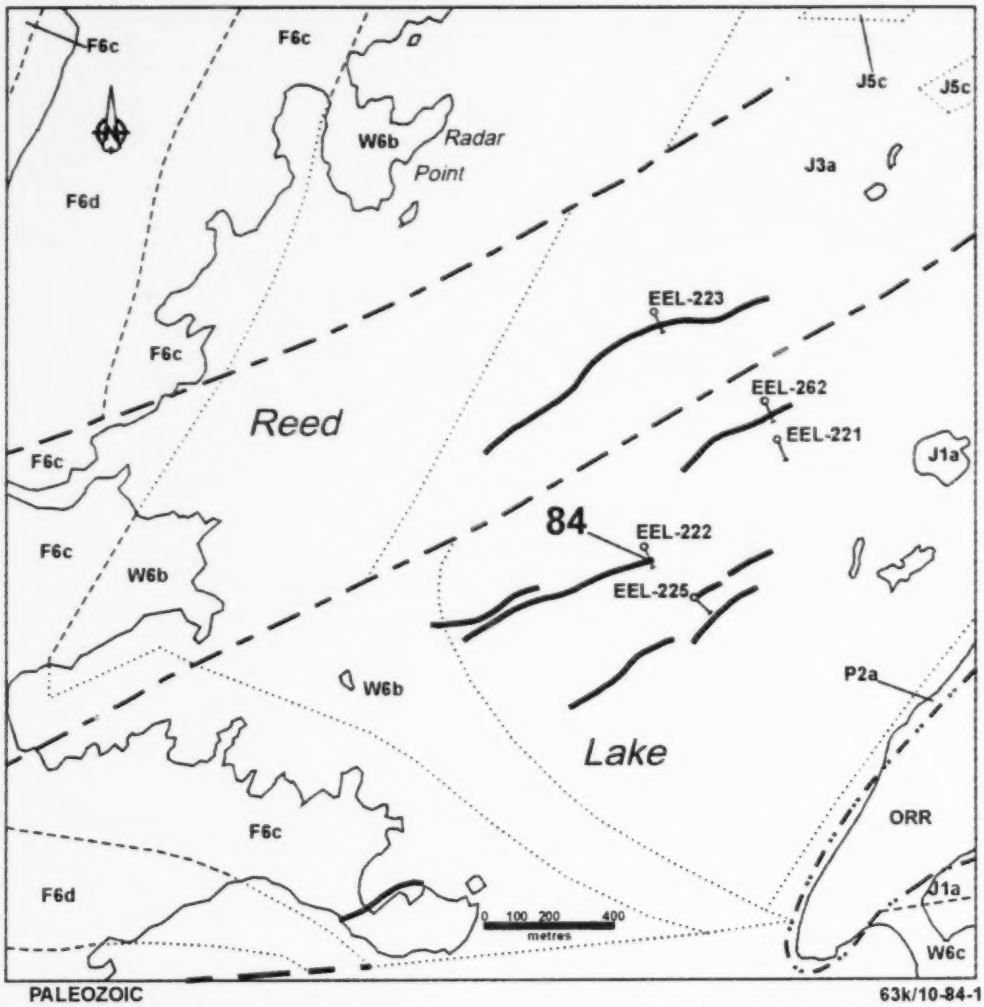
A.F. 91619, 91661 and 92447; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.



63k/10-84-1

PALEOZOIC

ORR Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

W6c Mafic phyllonite ± carbonate, cataclasite

P2a Gabbro, diorite

F6c Layered gabbro, leucogabbro, anorthosite

F6d Layered pyroxenite, peridotite, subordinate gabbro

J5c Heterolithologic breccia, dominantly mafic fragments

J3a Andesite; derived fine-grained garnetiferous amphibolite

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Paleozoic boundary

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92447)

Drillhole (A.F. 92447)

84 Mineral occurrence location

Figure 84-1: Geological setting of Occurrence 84.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 85

NAME: mineralization intersected by diamond drilling.
UTM: 396010 E 6053555 N
AREA: under western Reed Lake, approximately 1.4 km SE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Several holes were drilled by Hudson Bay Exploration and Development Company, Limited in 1973 to test several EM (Turam) responses in the area (A.F. 92447).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 85-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b), part of the Reed Lake strand of the West Reed-North Star Lake shear zone (Syme *et al.*, 1995), occurs to the west and SW.

The sequence intersected by DDH EEL-221 is dominated by (flow?) banded and foliated felsic volcanic rocks, much of which are described as being fragmental (A.F. 92447). Chlorite and sericite schist is common, and diorite containing felsic fragmental intervals (xenoliths?) occurs over one 49.2 ft. (15.0 m) section.

MINERALIZATION

The sulphides occur as disseminations, dominantly in discrete, thin, banded intervals. Some of the intervals grade into "massive" sulphides and some chloritic alteration is present (A.F. 92447). The mineralization intersected in hole EEL-221 is summarized below:

Interval	Mineralization
142.1-168.0 ft. (43.3-51.2 m)	1-60% pyrite
173.6-182.2 ft. (52.9-55.5 m)	5-90% pyrite
199.0-201.0 ft. (60.7-61.3 m)	10-20% pyrite
210.8-211.5 ft. (64.3-64.5 m)	1-15% pyrite
270.0-275.7 ft. (82.3-84.0 m)	2-15% pyrite, trace to 1% pyrrhotite
280.5-282.3 ft. (85.5-86.0 m)	2-15% pyrite, trace to 1% chalcopyrite
338.0-340.2 ft. (103.0-103.7 m)	2-25% pyrrhotite, 1-3% pyrite, 2-10% graphite
421.5-422.1 ft. (128.5-128.7 m)	1-15% pyrrhotite, trace to 2% pyrite, 1-5% graphite
471.7-473.4 ft. (143.8-144.3 m)	3-10% pyrrhotite
492.4-494.0 ft. (150.1-150.6 m)	8-60% pyrrhotite, trace to 1% pyrite
500.3-502.1 ft. (152.5-153.0 m)	5-40% pyrrhotite, 2-15% pyrite, trace to 3% graphite
521.3-523.0 ft. (158.9-159.4 m)	2-40% pyrrhotite, trace to 1% graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

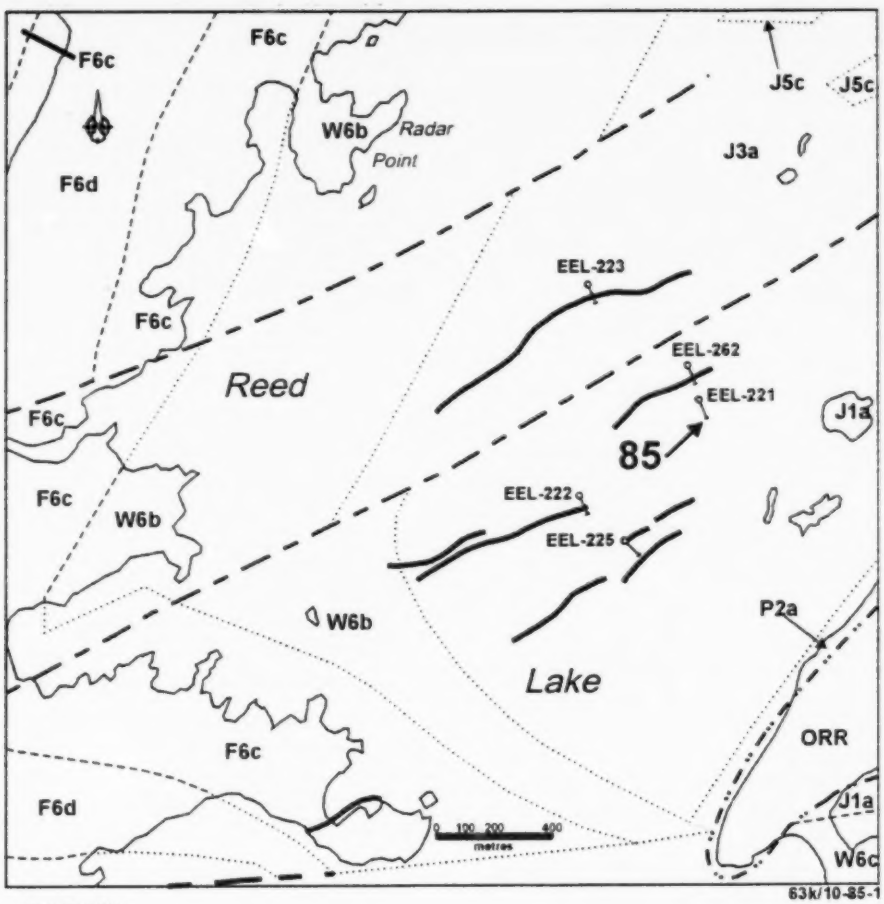
Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 92447; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOZOIC

ORR — Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6b — Mafic tectonite with mafic-felsic intrusive sheets

W6c — Mafic phyllonite ± carbonate, cataclasite

P2a — Gabbro, diorite

F6c — Layered gabbro, leucogabbro, anorthosite

F6d, — Layered pyroxenite, peridotite, subordinate gabbro

J5c — Heterolithologic breccia, dominantly mafic fragments

J3a — Andesite; derived fine-grained garnetiferous amphibolite

J1a — Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Paleozoic boundary

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92447)

Drillhole (A.F. 92447)

85 — Mineral occurrence location

Figure 85-1: Geological setting of Occurrence 85.

Syme, E.C. and Bailes, A.H.

1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.

LOCATION: 86

NAME: mineralization intersected by diamond drilling.
UTM: 395795 E 6053070 N
AREA: under western Reed Lake, approximately 1.5 km SE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Several holes were drilled by Hudson Bay Exploration and Development Company, Limited in 1973 to test EM (Turam) responses in the area (A.F. 92447).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 86-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Mafic tectonite with mafic-felsic intrusive sheets (unit W6b), part of the Reed Lake strand of the West Reed-North Star Lake shear zone (Syme *et al.*, 1995), occurs to the west and SW.

The sequence inersected by hole EEL-225 is dominated by (flow?) banded and foliated felsic volcanic rocks, most of which are described as being fragmental (A.F. 92447). Chlorite schist occurs over a 33.2 ft. (10.1 m) interval, and a coarse grained mafic biotite-pyroxene rock is present in a 9.0 ft. (2.7 m) section.

MINERALIZATION

The pyrite occurs in disseminated and earthy forms, dominantly as discrete, thin, banded intervals. Some of the intervals grade into "massive" sulphides and some chloritic alteration is present (A.F. 92447). The mineralization intersected in hole EEL-225 is summarized below (see following table).

Interval	Mineralization
146.0-240.5 ft. (44.5-73.3 m)	1-95% pyrite, trace to 5% graphite
267.6-271.2 ft. (81.6-82.7 m)	1-4% pyrrhotite, trace to 3% pyrite
285.7-291.9 ft. (87.1-89.0 m)	1-4% pyrrhotite, 1-3% pyrite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91619, 91661 and 92447; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

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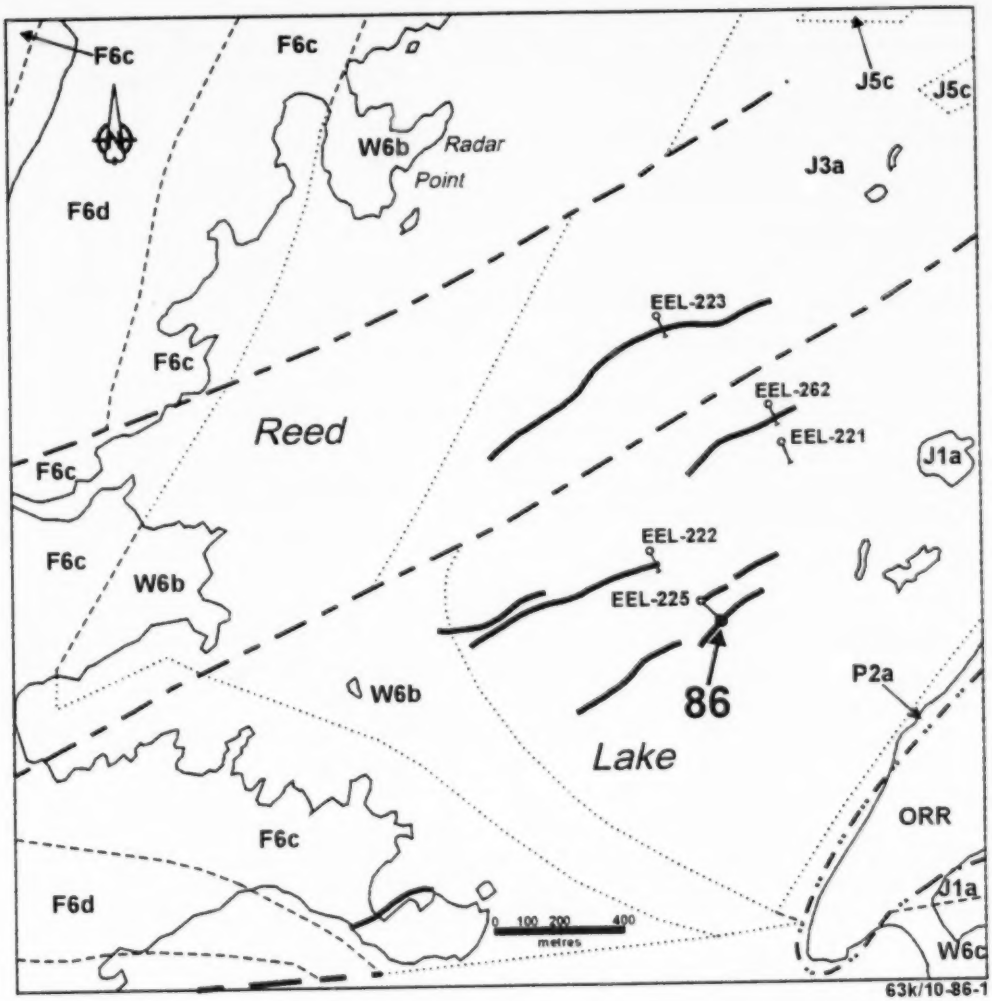
Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOZOIC

ORR Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6b Mafic tectonite with mafic-felsic intrusive sheets

W6c Mafic phyllonite ± carbonate, cataclasite

P2a Gabbro, diorite

F6c Layered gabbro, leucogabbro, anorthosite

F6d Layered pyroxenite, peridotite, subordinate gabbro

J5c Heterolithologic breccia, dominantly mafic fragments

J3a Andesite; derived fine-grained garnetiferous amphibolite

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Paleozoic boundary

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92447)

Drillhole (A.F. 92447)

• 86 Mineral occurrence location

Figure 86-1: Geological setting of Occurrence 86.

LOCATION: 87

NAME: mineralization intersected by diamond drilling.
UTM: 396775 E 6053485 N
AREA: under SW Reed Lake, approximately 2.1 km ESE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB undertook an HLEM survey over the area and drilled several geophysical targets in 1981 (A.F. 93105).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 87-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Gabbro and diorite (unit P2a) and a Palaeozoic dolostone outlier occur in the eastern part of the area.

Hole RAD-1 intersected a mafic ("andesite") to felsic ("rhyodacite" and quartz porphyry) metavolcanic sequence containing several sericite and chloritic schist intervals (A.F. 93105). Some of the units are described as being fragmental.

MINERALIZATION

The host lithology for the first mineralized interval in drillhole RAD-1 is a "quartz-biotite schist" (A.F. 93105). The second mineralized interval occurs in the contact area between siliceous "dacite" and fragmental "andesite". These intervals are summarized below.

Interval	Mineralization
118.5-121.0 ft. (36.1-36.9 m)	15% pyrite
381.2-405.5 ft. (116.2-123.6 m)	5-15% pyrrhotite and pyrite as stringers and disseminations

GEOCHEMICAL DATA

Assays obtained from sulphide-bearing intervals in hole RAD-1 are summarized below (A.F. 93105):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
118.5-121.0 ft. (36.1-36.9 m)	0.01	0.01	0.05	0.5
239.0-242.0 ft. (72.8-73.8 m)	—	—	0.05	0.5
257.0-259.0 ft. (78.3-78.9 m)	0.01	0.03	0.05	0.5
276.5-280.0 ft. (84.3-85.3 m)	0.01	0.03	0.05	0.5
381.2-387.0 ft. (116.2-118.0 m)	0.01	0.03	0.05	0.5
387.0-392.6 ft. (118.0-119.7 m)	0.01	0.04	0.05	0.5
392.6-397.0 ft. (119.7-121.0 m)	0.02	0.04	0.05	0.5
397.0-401.2 ft. (121.0-122.3 m)	0.01	0.05	0.05	0.5
401.2-405.5 ft. (122.3-123.6 m)	0.02	0.03	0.05	0.5

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 91619, 91661 and 93105; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

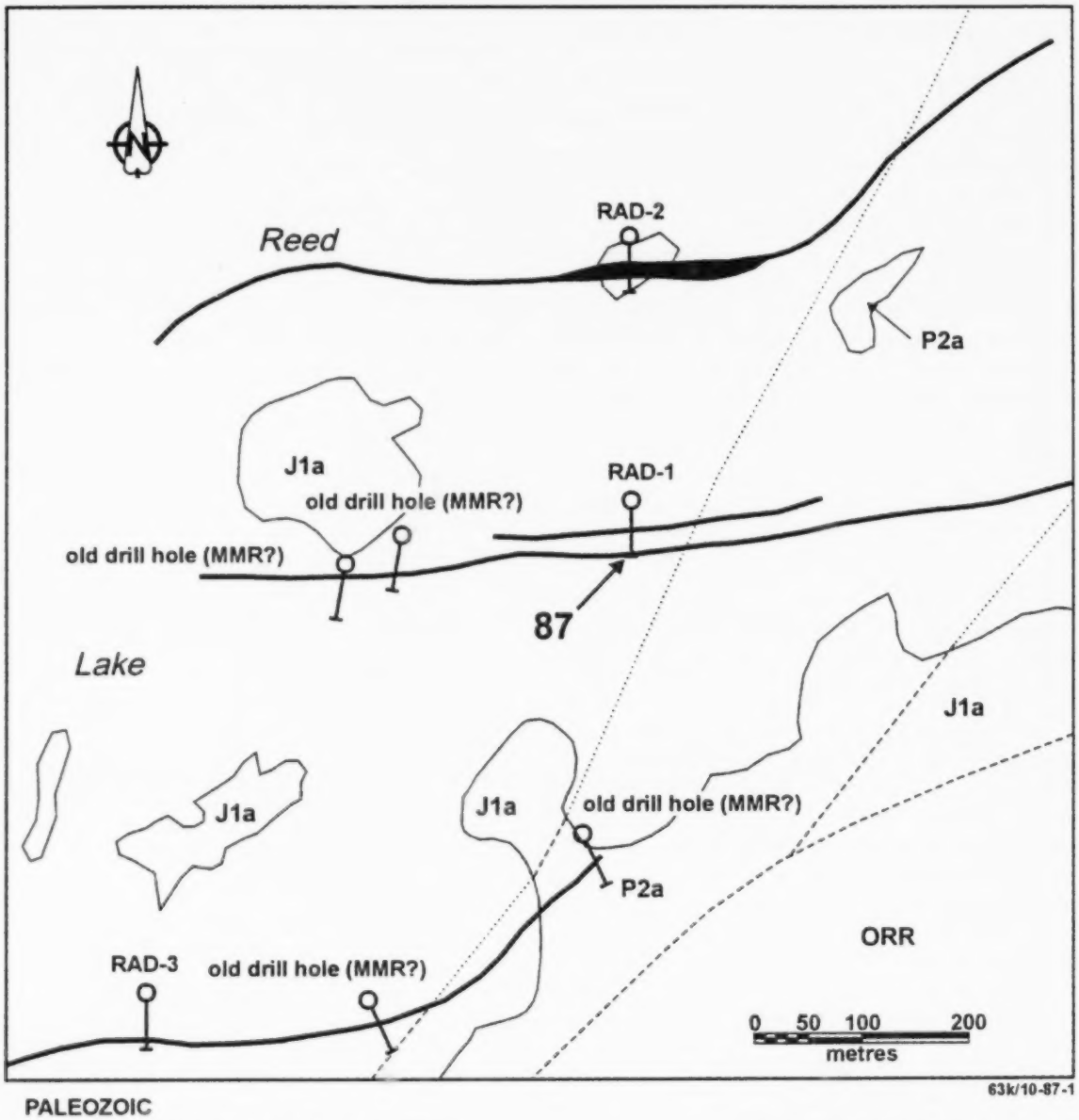
1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOZOIC

ORR — Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

P2a — Gabbro, diorite

J1a — Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 93105)

Drillhole (A.F. 93105)

87 Mineral occurrence location

Figure 87-1: Geological setting of Occurrence 87.

LOCATION: 88

NAME: mineralization intersected by diamond drilling.
UTM: 396775 E 6053740 N
AREA: under SW Reed Lake, approximately 2 km ESE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB undertook an HLEM survey over the area and drilled several geophysical targets in 1981 (A.F. 93105).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 88-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Gabbro and diorite (unit P2a) occur in the eastern part of the area, and a Palaeozoic dolostone outlier is located SSE of the occurrence.

The top 172.0 ft. (52.4 m) of hole RAD-2 intersected massive, fine to medium grained rock, described as gabbro and diorite, with minor chlorite schist (A.F. 93105). The lower 42.0 ft. (12.8 m) consists of felsic metavolcanic rocks ("rhyodacite" and "dacite").

MINERALIZATION

The host rock to the mineralization in hole RAD-2 is not described, but occurs at the contact between "rhyodacite" and "dacite" units (A.F. 93105). It is summarized as follows:

Interval	Mineralization
188.5-189.7 ft. (57.5-57.8 m)	10% pyrite and pyrrhotite
192.5-202.5 ft. (58.7-61.7 m)	8-10% pyrite and pyrrhotite

GEOCHEMICAL DATA

The assay results obtained from sampled sulphide-rich areas in drillhole RAD-2 are summarized below (A.F. 93105):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
188.5-189.7 ft. (57.5-57.8 m)	—	—	0.05	0.5
192.5-197.0 ft. (58.7-60.0 m)	0.01	0.03	0.05	1.0
197.0-202.0 ft. (60.0-61.6 m)	0.01	0.03	0.05	0.5
202.0-208.0 ft. (61.6-63.4 m)	0.02	0.04	0.05	0.5

CLASSIFICATION

Disseminated mineralization - not classified.

REFERENCES

A.F. 91619, 91661 and 93105; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

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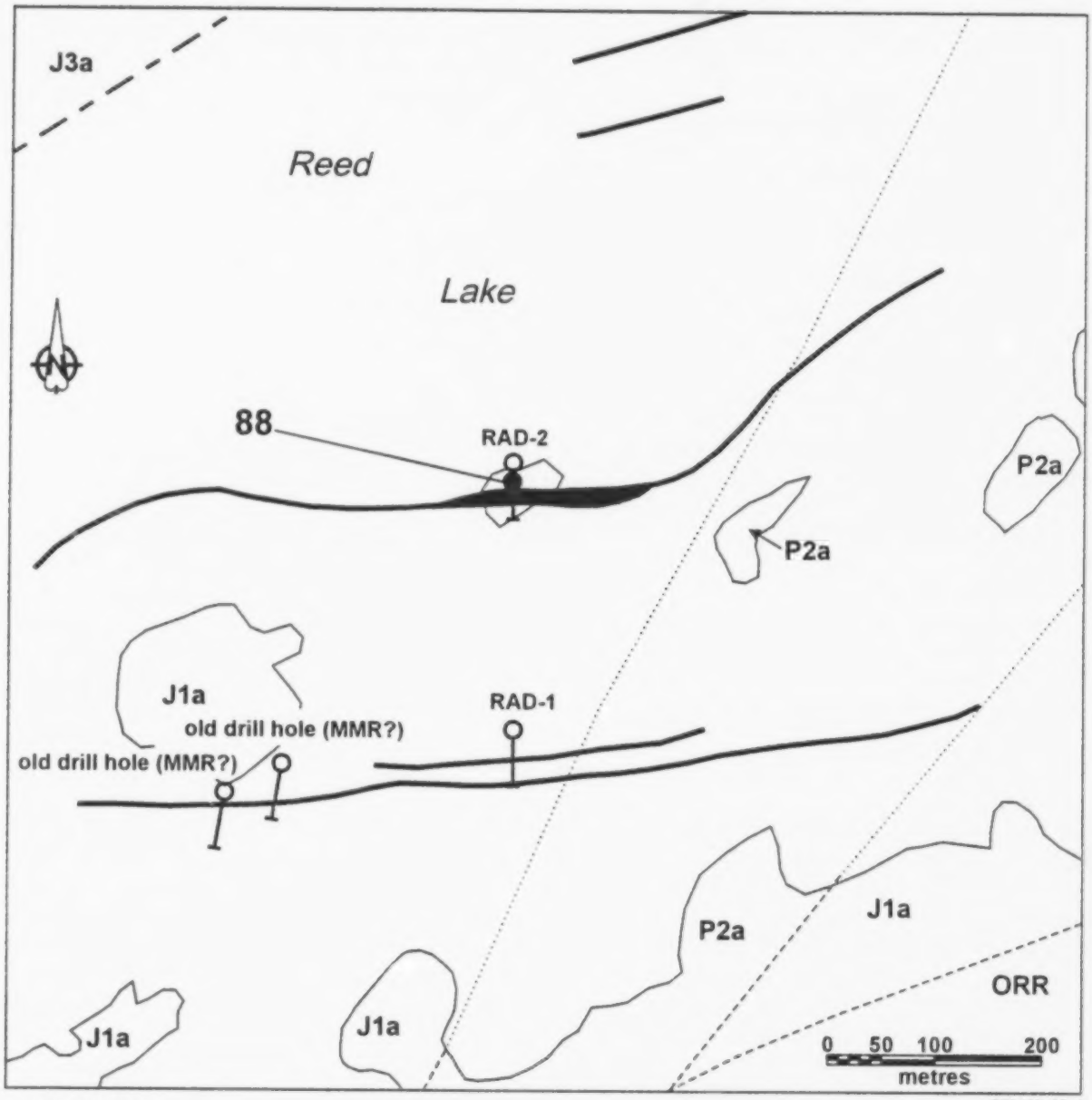
Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOZOIC

ORR Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

P2a Gabbro, diorite

J3a Andesite; derived fine-grained garnetiferous amphibolite

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 93105)

Drillhole (A.F. 93105)

88 Mineral occurrence location

Figure 88-1: Geological setting of Occurrence 88.

LOCATION: 89

NAME: mineralization intersected by diamond drilling.
UTM: 397045 E 6054210 N
AREA: under SW Reed Lake, approximately 2.2 km ESE of Radar Point.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26325-33

EXPLORATION SUMMARY

In 1955 Hudson Bay Exploration and Development Company, Limited had an airborne EM and radiometric survey flown over the area (A.F. 91619). In 1966 and 1967 Hudson Bay Exploration and Development Company, Limited did an airborne EM and radiometric survey over the area under Airborne Permit No. 67 (A.F. 91661). Gränges Exploration AB undertook an HLEM survey over the area and drilled several geophysical targets in 1981 (A.F. 93105).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 89-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994). Gabbro and diorite (unit P2a) occur in the eastern part of the area, and a Palaeozoic dolostone outlier is located SSE of the occurrence.

Hole RAD-4 intersected a sequence consisting of medium- to fine-grained "quartz diorite" and massive, fine grained "andesite" (A.F. 93105).

MINERALIZATION

The host lithology to the sulphide mineralization was not well described, but consists of a fine grained, contorted siliceous rock type (rhyolite?) (A.F. 93105). The mineralization intersected in hole RAD-4 is summarized below.

Interval	Mineralization
200.0-204.6 ft. (61.0-62.4 m)	10-60% pyrite, trace chalcopyrite
204.6-209.5 ft. (62.4-63.9 m)	to 10% pyrrhotite and pyrite

GEOCHEMICAL DATA

The following assays were obtained from mineralized intervals in hole RAD-4 (A.F. 93105):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
200.5-203.5 ft. (61.1-62.0 m)	0.03	0.01	0.05	0.5
203.5-204.6 ft. (62.0-62.3 m)	0.03	0.01	0.05	0.5
204.6-207.0 ft. (62.3-63.1 m)	0.04	0.01	0.05	1.0
207.0-209.5 ft. (63.1-63.9 m)	0.01	0.02	0.05	0.5

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

A.F. 91619, 91661 and 93105; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

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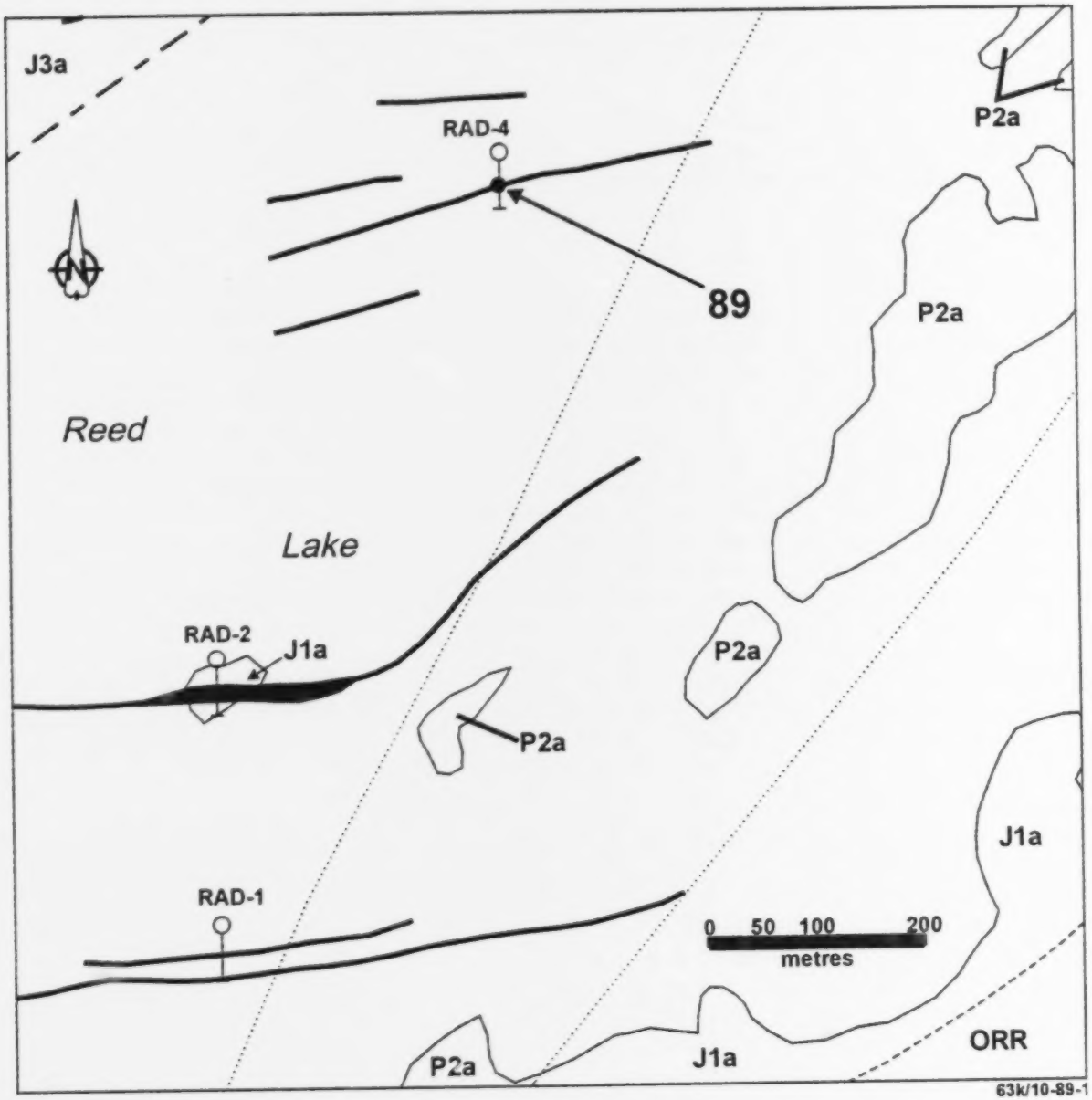
Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); **in** Manitoba Energy and Mines, Minerals Division, Report of Activities 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; **in** Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOZOIC

ORR — Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

P2a — Gabbro, diorite

J3a — Andesite; derived fine-grained garnetiferous amphibolite

J1a — Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

------ Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

— – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 93105)

Drillhole (A.F. 93105)

89● Mineral occurrence location

Figure 89-1: Geological setting of Occurrence 89.

LOCATION: 90

NAME: mineralization intersected by diamond drilling.
UTM: 402265 E, 6056415 N
AREA: under Reed Lake approximately 1.7 km N of Peterson's Lodge, Fourmile Island.
ACCESS: via boat from Reed Lake provincial campground.
AIRPHOTO: A26367-151

EXPLORATION SUMMARY

Hudson Bay Exploration and Development Company, Limited undertook a ground EM (Turam) survey over the area and subsequently drilled several of the conductive responses in 1972 (A.F. 91667).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 90-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by andesite and derived fine-grained garnetiferous amphibolite (unit J3a). Recent work has indicated that these are arc tholeiites (Syme *et al.*, 1995; Syme and Bailes, 1996; Williamson, 1994).

The top of the hole intersected 171.5 ft. (52.3 m) of mafic volcanic rock ("andesite") containing several intervals with low quantities of pyrite and graphite. The bottom 119.3 ft. (36.4 m) intersected a sequence of metasediments consisting of well layered interbedded argillite and greywacke (A.F. 91667).

MINERALIZATION

Most of the sulphide mineralization occurs in the metasedimentary sequence at the bottom of the hole. Low quantities of graphite are present in some intervals (A.F. 91667). The main mineralized intervals intersected in hole EEL-176 are summarized below.

Interval	Mineralization
273.1-274.6 ft. (83.2-83.7 m)	5% pyrite, trace to 1% graphite
350.0-354.5 ft. (106.7-108.1 m)	to 80% pyrite, to 10% graphite
364.5-365.6 ft. (111.1-111.4 m)	70% pyrite, 10% graphite

GEOCHEMICAL DATA

No assays were reported for this hole.

CLASSIFICATION

Sedimentary rock-hosted massive sulphide. The presence of graphite suggests a biogenic component to the sequence.

REFERENCES

A.F. 91667; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C. and Bailes, A.H.

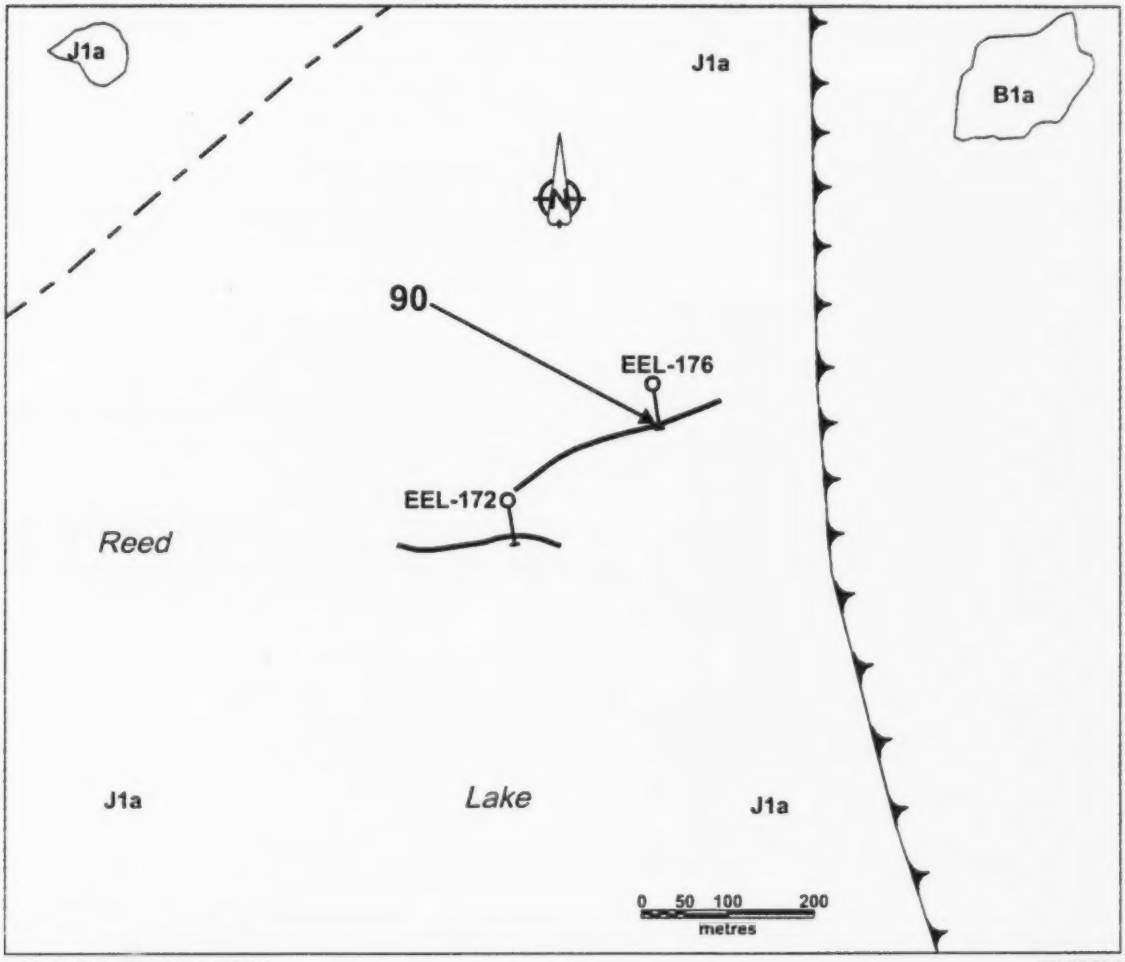
1996: Geochemistry of arc and ocean-floor metavolcanic rocks in the Reed Lake area, Flin Flon belt; in Manitoba Energy and Mines, Minerals Division, Report of Activities 1996, p. 52-65.

Syme, E.C., Bailes, A.H. and Lucas, S.B.

1995: Geology of the Reed Lake area (Parts of 63K/9 and 63K/10); in Manitoba Energy and Mines, Minerals Division, Report of Activities, 1995, p. 42-60.

Williamson, B.L.

1994: Amisk Group volcanic rocks hosting the Reed Lake gabbro; in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 68-80.



PALEOPROTEROZOIC

B1a Burntwood Group: greywacke, siltstone, mudstone

J1a Tholeiitic basalt, basaltic andesite; gabbro, derived amphibolite

— – Fault (approximate) - NATMAP Shield Margin Project Working Group, 1998

Thrust fault: Morton Lake Fault Zone - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 91667)

Drillhole (A.F. 91667)

90 Mineral occurrence location

Figure 90-1: Geological setting of Occurrence 90.

LOCATION: 91

NAME: mineralization intersected by diamond drilling.
UTM: 389670 E 6050475 N
AREA: approximately 0.5 km south of Provincial Highway 39, south of Flag Lake
ACCESS: via Provincial Highway 39, then traverse
AIRPHOTO: A26325-93

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, after which an interpretation of the results was performed (A.F. 91708). In 1973-74, ground EM (Turam) and magnetic surveys were carried out on behalf of Freeport Canadian Exploration Company (A.F. 92716). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). Hudson Bay Exploration and Development Company, Limited drilled an EM (Turam) conductor in 1978 (A.F. 92717).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 91-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by Ordovician dolostone of the Red River Formation, which covers undivided juvenile volcanic rocks (unit J15) (Leclair *et al.*, 1997).

Hole FB-5 intersected 40.0 ft. (12.2 m) limestone and unconsolidated and lithified sandstone (A.F. 92717). The Palaeozoic sequence is underlain by green chloritic "andesite".

MINERALIZATION

In drillhole FB-5, sulphide mineralization occurs as interbeds in chloritic "andesite" over the following intervals (A.F. 92717):

Interval	Mineralization
128.0-129.0 ft. (39.0-39.3 m)	10-15% pyrite
158.0-160.0 ft. (48.2-48.8 m)	5-7% pyrite

GEOCHEMICAL DATA

The following assays were obtained from mineralized intervals in hole FB-5 (A.F. 92717):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
128.2-128.8 ft. (39.1-39.3 m)	tr	tr	tr	tr
155.7-156.6 ft. (47.5-47.7 m)	0.10	—	—	—

CLASSIFICATION

Chemical-sediment type deposit; sulphide facies iron formation.

REFERENCES

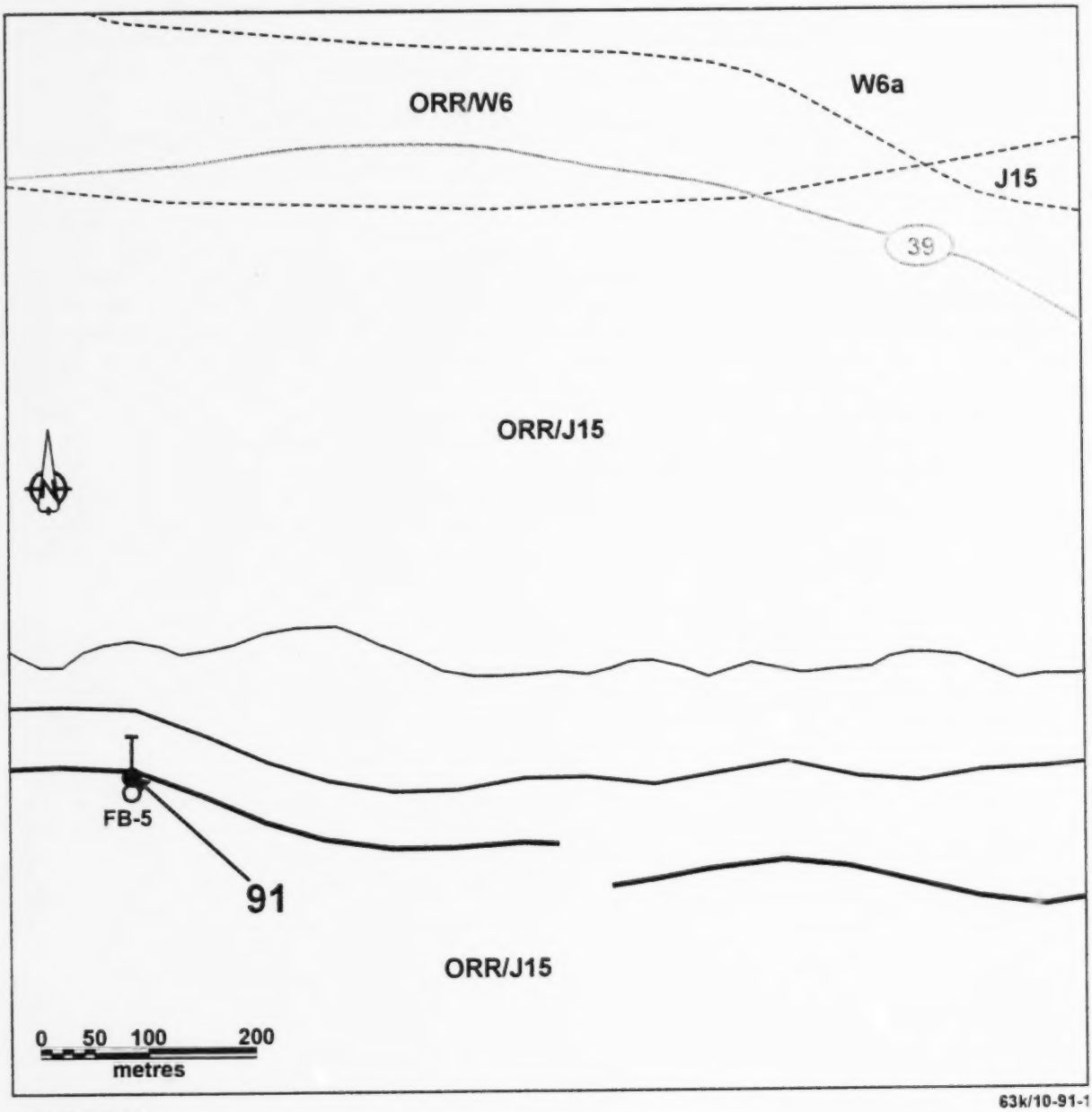
A.F. 91708, 92472, 92716 and 92717; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services

Leclair, A.D., Lucas, S.B., Broome, H.J., Viljoen, D.W. and Weber, W.

1997: Regional mapping of Precambrian basement beneath Phanerozoic cover in southeastern Trans-Hudson orogen, Manitoba and Saskatchewan; Canadian Journal of Earth Sciences, v. 34, p. 618-634.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.



PALEOZOIC

ORR — Ordovician - Red River Formation dolostone

PALEOPROTEROZOIC

W6 — Tectonite, phyllonite, mylonite

W6a — Mafic tectonite, phyllonite, mylonite

J15 — Undivided juvenile arc rocks

------ Geological contact (approximate) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92716)

39 — Provincial highway

Drillhole (A.F. 92717)

91 ● Mineral occurrence location

Figure 91-1: Geological setting of Occurrence 91.

LOCATION: 92

NAME: mineralization intersected by diamond drilling.
UTM: 390065 E 6050465 N
AREA: AREA: approximately 0.7 km south of Provincial Highway 39, south of Flag Lake.
ACCESS: via Provincial Highway 39, then traverse.
AIRPHOTO: A26325-93

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area, after which an interpretation of the results was performed (A.F. 91708). In 1973-74, ground EM (Turam) and magnetic surveys were carried out on behalf of Freeport Canadian Exploration Company (A.F. 92716). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). Hudson Bay Exploration and Development Company, Limited drilled one of the conductors, outlined by an EM (MaxMin II) survey in 1984 (A.F. 92725, 92729).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 92-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by Ordovician dolostone of the Red River Formation, which covers undivided juvenile volcanic rocks (unit J15) (Leclair *et al.*, 1997).

Holes FB-56, -57 and -58 did not recover any dolostone and it is possible that a fenster through the Palaeozoic cover exists in the area (A.F. 92725, 92729). The top 10 to 135 ft. (3.0 to 41.1 m) of core in each hole consists of an altered sequence that is probably part of a Palaeozoic regolith formed prior to deposition of the Ordovician carbonates. The Precambrian sequence intersected in the holes consists of interlayered "andesite" and intermediate to felsic cherty tuffs.

MINERALIZATION

Sulphides, mainly as stringers, occur in intermediate schist and tuffaceous rocks over the following intervals (A.F. 92725, 92729) (see table below).

Interval	Mineralization
hole FB-56	
129.0-131.5 ft. (39.3-40.1 m)	7-10% pyrite as bands and streaks
137.2-138.2 ft. (41.8-42.1 m)	5% pyrite as stringers
139.5-141.2 ft. (42.5-43.0 m)	7% pyrite as stringers, trace to 1% chalcopyrite (?)
175.8-177.3 ft. (53.6-54.0 m)	7% pyrite as stringers
209.5-210.0 ft. (63.9-64.0 m)	50-55% pyrite, trace to 1% chalcopyrite
234.3-235.0 ft. (71.4-71.6 m)	5% pyrite, disseminated and stringer
292.5-293.0 ft. (89.2-89.3 m)	15% pyrite
173.7-174.3 ft. (52.9-53.1 m)	5% pyrite as stringers
217.5-219.5 ft. (66.3-66.9 m)	10-12% pyrite as stringers

GEOCHEMICAL DATA

The following assays were obtained from sulphide-bearing intervals (A.F. 92725, 92729) (see table below).

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
hole FB-56				
128.5-129.0 ft. (39.2-39.3 m)	0.09	0.4	0.3	7.2
129.0-131.5 ft. (39.3-40.1 m)	0.05	0.1	—	—
131.5-132.0 ft. (40.1-40.2 m)	0.08	—	—	—
209.5-210.0 ft. (63.9-64.0 m)	—	0.2	—	3.4
hole FB-58				
213.0-215.0 ft. (64.9-65.5 m)	—	0.3	—	—
215.0-217.0 ft. (65.5-66.1 m)	—	0.2	—	—
217.0-219.0 ft. (66.1-66.8 m)	0.10	0.2	—	—
219.0-219.5 ft. (66.8-66.9 m)	0.07	0.1	—	—

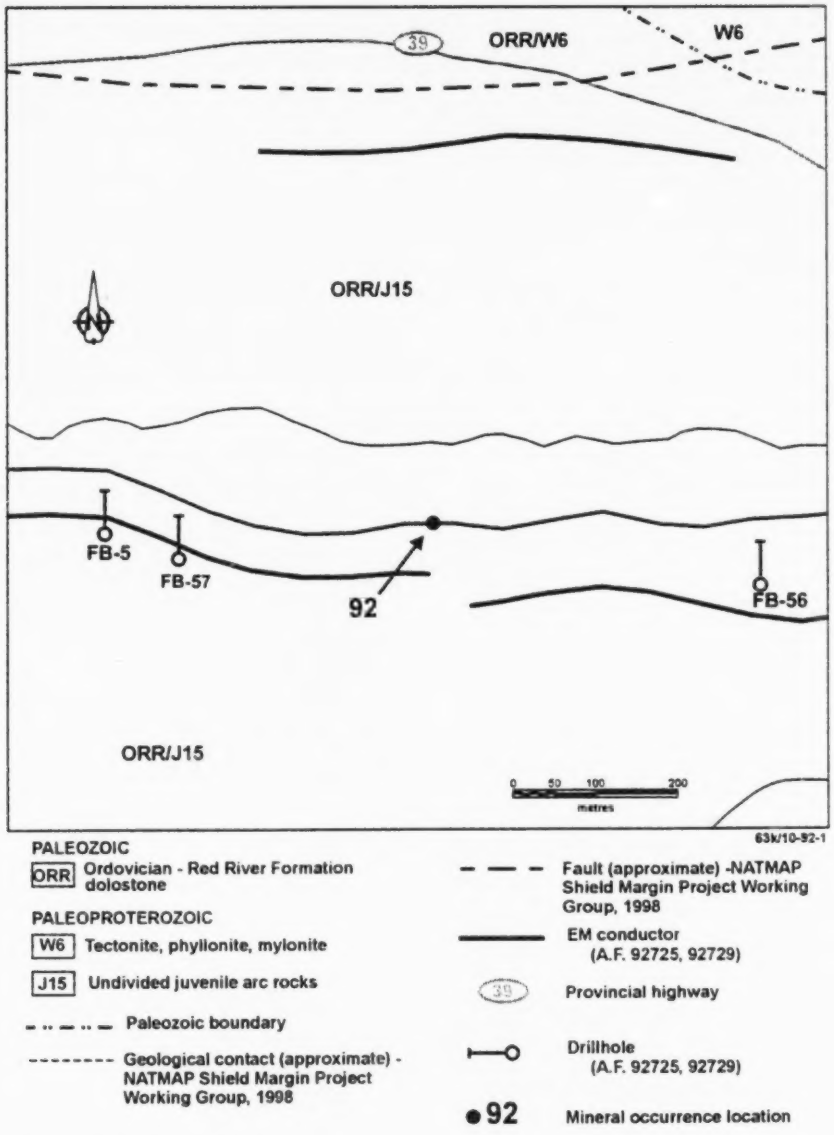


Figure 92-1: Geological setting of Occurrence 92.

CLASSIFICATION

Vein type deposit; stockwork (?).

REFERENCES

A.F. 91708, 92472, 92716, 92725 and 92729; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Leclair, A.D., Lucas, S.B., Broome, H.J., Viljoen, D.W. and Weber, W.

1997: Regional mapping of Precambrian basement beneath Phanerozoic cover in southeastern Trans-Hudson orogen, Manitoba and Saskatchewan; Canadian Journal of Earth Sciences, v. 34, p. 618-634.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

LOCATION: 93

NAME: mineralization intersected by diamond drilling.
UTM: 400640 E 6041510 N
AREA: under Black Duck Lake, approximately 7.5 km south of Provincial Highway 39 near turnoff to Reed Lake provincial campground.
ACCESS: via bush aircraft, or by trail from Highway 39 to Black Duck Lake.
AIRPHOTO: A24478-20

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). An airborne EM survey was carried out for Parmlee Manitoba Mining Company Limited in 1957 followed by ground EM and magnetic surveys, geological mapping and diamond drilling over selected targets (A.F. 91707). Hudson Bay Exploration and Development Company, Limited drilled two holes targeted on an HLEM (MaxMin II) conductor that correlated with a ground magnetic response (A.F. 93116).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 93-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998).The area is underlain by Ordovician dolostone of the Red River Formation, which covers undivided juvenile volcanic rocks (unit J15) (Leclair *et al.*, 1998).

Hole FB-63 intersected 21.0 ft. (6.4 m) of dolostone and sandstone, but only some carbonate pebbles were recovered in a 2 ft. (0.6 m) interval in hole FB-65 (A.F. 93116). The top 59 to 135 ft. (18.0 to 41.1 m) of the Precambrian sequence is altered, and is probably part of the Palaeozoic regolith formed prior to deposition of the Ordovician sequence. The Precambrian sequence intersected in hole FB-63 is dominated by feldspar-phyric "andesite" and lesser "andesitic" tuffs and tuffaceous siltstone. Granitic, granodioritic and dioritic intervals are also present. Volcanic rocks appear to be absent in hole FB-65, and the sequence is described as consisting of "andesite" tuff, tuffaceous siltstone and graphitic argillite (A.F. 93116).

MINERALIZATION

Sulphide mineralization intersected in hole FB-63 occurs dominantly in a "quartz vein" (quartzite?) over the first four intervals summarized below (A.F. 93116). The last mineralized interval is in a mafic to intermediate tuff or arenite. The character of the mineralization is not well described, but part of it occurs as stringers.

Interval	Mineralization
260.0-271.0 ft. (79.2-82.6 m)	5-7% pyrite as stringers
272.5-273.5 ft. (83.1-83.4 m)	40-50% pyrite
282.0-282.9 ft. (86.0-86.2 m)	35% pyrite, trace chalcopyrite
282.9-283.8 ft. (86.2-86.5 m)	5% pyrite as stringers
295.9-296.6 ft. (90.2-90.4 m)	5-8% pyrite as stringers

GEOCHEMICAL DATA

The following assays were obtained from sampled sulphide-bearing intervals intersected by drillhole FB-63 (A.F. 93116):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
265.0-267.5 ft. (80.8-81.5 m)	0.22	0.1	—	—
270.0-272.5 ft. (82.3-83.1 m)	0.12	0.1	—	—
272.5-275.0 ft. (83.1-83.8 m)	0.16	0.2	—	—
282.0-282.9 ft. (86.0-86.2 m)	0.23	—	—	3.4
282.9-283.8 ft. (86.2-86.5 m)	0.15	0.1	—	tr
324.0-327.0 ft. (98.8-99.7 m)	0.06	0.1	—	—

CLASSIFICATION

Vein type deposit; stockwork (?).

REFERENCES

A.F. 91707, 91708 and 93116; Cancelled Assessment Files, Manitoba Energy and Mines, Geologic Services.

Leclair, A.D., Lucas, S.B., Broome, H.J., Viljoen, D.W. and Weber, W.

1997: Regional mapping of Precambrian basement beneath Phanerozoic cover in southeastern Trans-Hudson orogen, Manitoba and Saskatchewan; Canadian Journal of Earth Sciences, v. 34, p. 618-634.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

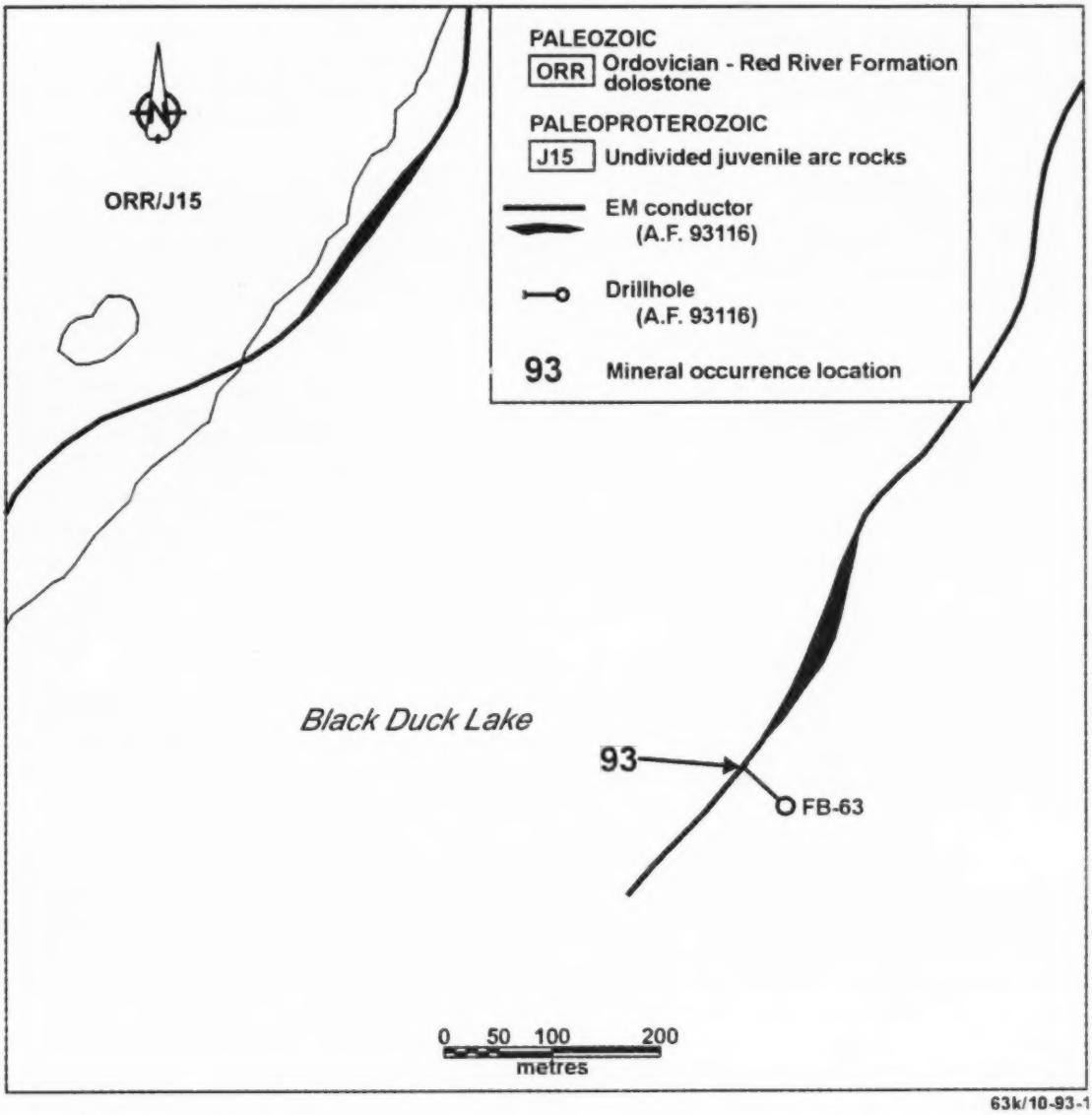


Figure 93-1: Geological setting of Occurrence 93.

LOCATION: 94

NAME: mineralization intersected by diamond drilling.
UTM: 386500 E, 6051990 N
AREA: under SE part of Loucks Lake.
ACCESS: via boat on the Grass River and Loucks Lake from Iskwasum Lake provincial campground.
AIRPHOTO: A26325-95

EXPLORATION SUMMARY

In 1956 an airborne geophysical survey combining EM, magnetic and radiometric surveys was carried out in the area (A.F. 91708). In 1964 Hudson Bay Mining and Smelting Company, Limited performed an airborne EM and radiometric survey in the Iskwasum Lake area (A.F. 91854). The Canadian Nickel Company Limited performed an airborne EM, magnetic and radiometric survey over the area in 1981 (A.F. 92472). In 1985 Granges Exploration Limited drilled several HLEM conductors under Loucks Lake (A.F. 92819).

GEOLOGICAL SETTING

The geological unit designations indicated on the geological setting map (Fig. 94-1) and their descriptions are from the maps of the NATMAP Shield Margin Project Working Group (1998). The area is underlain by mafic phyllonite, tectonite and mylonite (unit W6a) and felsic tectonite and mylonite (unit P11a) of the Loucks Lake shear zone, which is hosted by granodiorite and tonalite (units P7a and P7b) of the Gants Lake batholith (Syme, 1994).

Hole RAD-11 intersected a sequence of fine grained mafic rocks ("andesite" and "basalt"), "banded argillite", and "quartz-chlorite gneiss" (A.F. 92819). The description for this assemblage suggests that these rocks are part of the shear zone. The protoliths for these rock types cannot presently be ascertained.

MINERALIZATION

A single pyrrhotite-rich interval occurs in drillhole RAD-11 as a banded breccia infilling in quartz-chlorite gneiss (A.F. 92819), as summarized below (see following table).

Interval	Mineralization
51.21-51.82 m	40-50% pyrrhotite, banded and as breccia infill

GEOCHEMICAL DATA

Samples collected from the mineralized area in hole RAD-11 returned the following assays (A.F. 92819):

Interval	%Cu	%Zn	Au (g/t)	Ag (g/t)
50.90-51.21 m	0.01	0.02	0.05	0.5
1.21-51.82 m	0.06	0.06	0.05	0.5
1.82-52.43	0.01	0.01	0.05	0.5

CLASSIFICATION

Vein type deposit; single vein.

REFERENCES

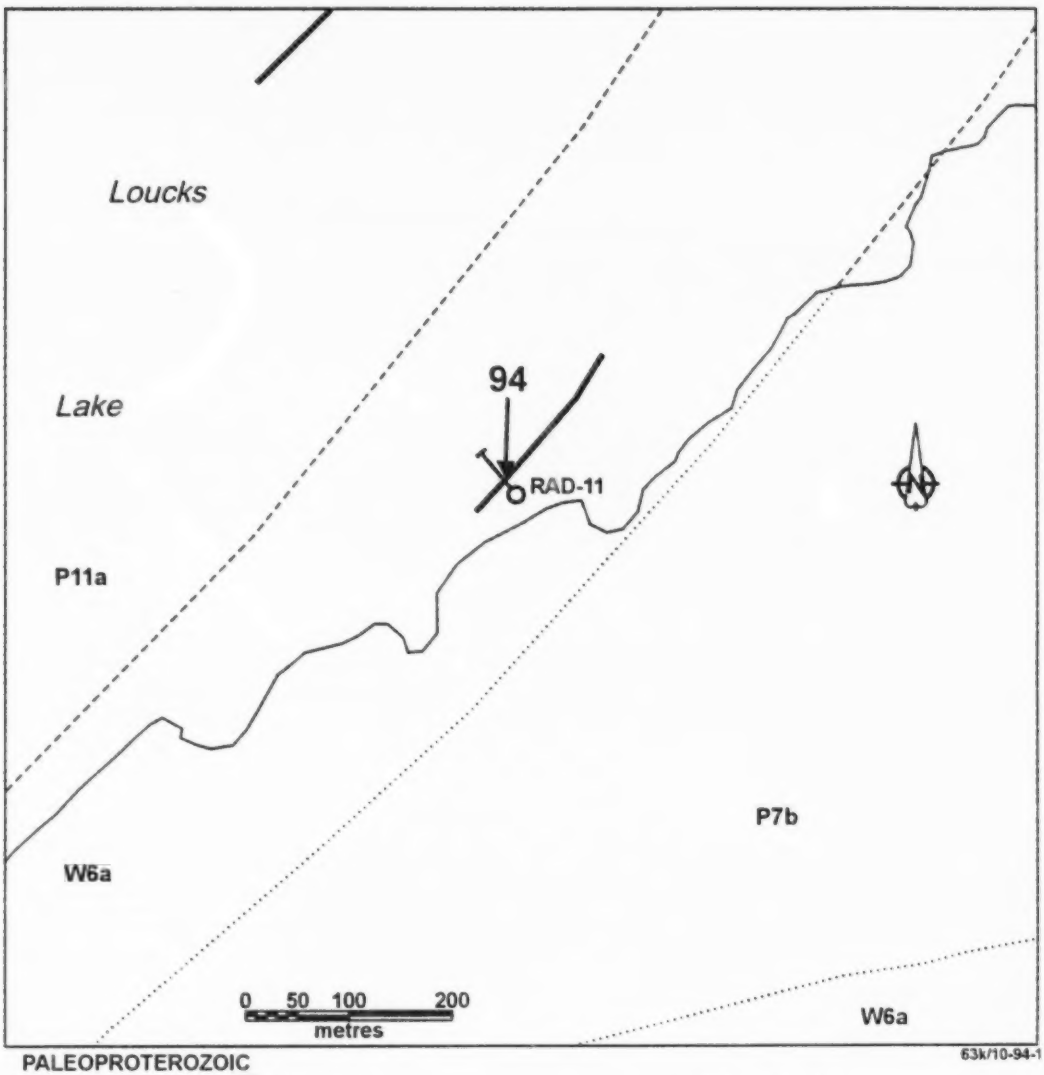
A.F. 91708, 91854, 92472, 92819; Cancelled Assessment File, Manitoba Energy and Mines, Geologic Services.

NATMAP Shield Margin Project Working Group

1998: Geology, NATMAP Shield Margin Project Area (Flin Flon Belt), Manitoba-Saskatchewan; Geological Survey of Canada Map 1968A, Manitoba Energy and Mines Map A-98-2, Sheets 1 to 7, Saskatchewan Energy and Mines Map 258A-2, scale 1:100 000.

Syme, E.C.

1994: Supracrustal rocks of the Iskwasum Lake area (63K/10W); in Manitoba Energy and Mines, Geologic Services, Report of Activities 1994, p. 47-56.



PALEOPROTEROZOIC

W6a Mafic tectonite, phyllonite, mylonite

P11a Felsic tectonite, mylonite

P7a Granodiorite

Geological contact (approximate, extrapolated) - NATMAP Shield Margin Project Working Group, 1998

EM conductor (A.F. 92819)

Drillhole (A.F. 92819)

94 Mineral occurrence location

Figure 94-1: Geological setting of Occurrence 94.